

State Primacy Crosswalk: Wyoming

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
GENERAL REQUIREMENTS			
PART 124--PROCEDURES FOR DECISION MAKING			
SUBPART A--GENERAL PROGRAM REQUIREMENTS			
40 CFR §124.10 Public notice of permit actions and public comment period.			
Methods (applicable to State programs, see 40 CFR 123.25 (NPDES), 145.11 (UIC), 233.23 (404), and 271.14 (RCRA)). Public notice of activities described in paragraph (a)(1) of this section shall be given by the following methods:	40 CFR §124.10(c)	Chapter 24 Section 19(a-b), Water Quality Rules and Regulations. Public notice is not required for minor modifications as described by Section 4(b) (x) of this chapter or for a permit denial where the application is determined incomplete. The administrator shall give public notice if a draft permit has been prepared or a hearing has been scheduled.	The state regulation requires public notice if a draft permit has been prepared or a hearing has been scheduled. This corresponds to 40 CFR 124(a)(1)(ii-iii). The state regulation does not mention or require public notice if a permit application has been tentatively denied (as does the federal requirement at 40 CFR 124(a)(1)(i)) or if an appeal has been granted (federal requirement at 40 CFR 124(a)(1)(iv)).
For Class VI injection well UIC permits, mailing or emailing a notice to State and local oil and gas regulatory agencies and State agencies regulating mineral exploration and recovery, the Director of the Public Water Supply Supervision program in the State, and all agencies that oversee injection wells in the State.	40 CFR §124.10(c)(1)(xi)	Chapter 24 Section 19(d)(i). Public notice shall be given by mailing a copy of the notice to the following persons: -The applicant, by certified or registered mail; -The U.S. Environmental Protection Agency; -Wyoming Game and Fish Department; -Wyoming State Engineer; -State Historical Preservation Officer; -Wyoming Oil and Gas Conservation Commission; -Wyoming State Geological Survey; -Wyoming Water Development Office; -Persons on the mailing list developed by the department, including those who request in writing to be on the list and by soliciting participants in public hearings in that area for their interest in being included on "area" mailing lists; and -Any unit of local government having jurisdiction over the area where the facility is proposed to be located.	Similar. Need to be specific regarding PWS, and other agencies that will be notified, i.e. LQD/WDEQ who run the Class III UIC program.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
PART 144--UNDERGROUND INJECTION CONTROL PROGRAM			
SUBPART A--GENERAL PROVISIONS			
40 CFR §144.1 Purpose and scope of Part 144.			
Subpart H of part 146 sets forth requirements for owners or operators of Class VI injection wells.	40 CFR §144.1(f)(1)(viii)	NONE	
<p><i>Scope of the permit or rule requirement.</i> The UIC permit program regulates underground injection by six classes of wells (see definition of “well injection,” §144.3). The six classes of wells are set forth in §144.6. All owners or operators of these injection wells must be authorized either by permit or rule by the Director. In carrying out the mandate of the SDWA, this subpart provides that no injection shall be authorized by permit or rule if it results in the movement of fluid containing any contaminant into underground sources of drinking water (USDWs –see §144.3 for definition), if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR part 141 or may adversely affect the health of persons (§144.12). Existing Class IV wells which inject hazardous waste directly into an underground source of drinking water are to be eliminated over a period of six months and new such Class IV wells are to be prohibited (§144.13). For Class V wells, if remedial action appears necessary, a permit may be required (§144.25) or the Director must require remedial action or closure by order (§144.6(c)). During UIC program development, the Director may identify aquifers and portions of aquifers which are actual or potential sources of drinking water. This will provide an aid to the Director in carrying out his or her duty to protect all USDWs. An aquifer is a USDW if it fits the definition under §144.3, even if it has not been “identified.” The Director may also designate “exempted aquifers” using the criteria in 40 CFR 146.4 of this chapter. Such aquifers are those which would otherwise qualify as “underground sources of drinking water” to be protected, but which have no real potential to be used as drinking water sources. Therefore, they are not USDWs. No aquifer is an exempted aquifer until it has been affirmatively designated under the procedures at §144.7. Aquifers which do not fit the definition of “underground source of drinking water” are not “exempted aquifers.” They are simply not subject to the special protection afforded USDWs. During initial Class VI program development, the Director shall not expand the areal extent of an existing Class II enhanced oil recovery or enhanced gas recovery aquifer exemption for Class VI injection wells and EPA shall not approve a program that applies for aquifer exemption expansions of Class II-Class VI exemptions as part of the program description. All Class II to</p>	40 CFR §144.1(g)	NONE	No equivalent provision is needed.

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Class VI aquifer exemption expansions previously issued by EPA must be incorporated into the Class VI program descriptions pursuant to requirements at §145.23(f)(9).***			
40 CFR §144.3 Definitions.			
<i>Geologic sequestration</i> means the long-term containment of a gaseous, liquid, or supercritical carbon dioxide stream in subsurface geologic formations. This term does not apply to carbon dioxide capture or transport.***	40 CFR §144.3	W.S. 35-11-103(c)(xx). "Geologic sequestration" means the injection of carbon dioxide and associated constituents into subsurface geologic formations intended to prevent its release into the atmosphere.	Note that the state rule does not define "GS project." The state statute says that geologic sequestration means the injection of "carbon dioxide and associated constituents" rather than of the "gaseous, liquid, or supercritical carbon dioxide stream." This is more inclusive than the federal rule. However, the state regulation does not clarify that geologic sequestration includes all phases of carbon dioxide (e.g., gaseous, liquid, or supercritical). While the state regulation says that geologic sequestration is intended "to prevent [the carbon dioxide's] release into the atmosphere," it does not explicitly reference "long-term" containment WY regs do not include "long-term" and phases of CO2, this may be a broader definition and less stringent
40 CFR §144.6 Classification of wells.			
Class V. Injection wells not included in Class I, II, III, IV, or VI. Specific types of Class V injection wells are described in §144.81.	40 CFR §144.6(e)	Chapter 13, Section 2(k) "Class V well" means any injection well not included in Classes I, II, III, or IV. Chapter 16, Section 1(e) "Class V facility" means any property which contains an injection well, drywell, or subsurface fluid distribution system which is not defined as a Class I, II, III, or IV well in Chapter 13, Water Quality Rules and Regulations. The Class V facility includes all systems of collection, treatment, and control which are associated with the subsurface disposal. Appendix A of this chapter contains a list of Class V facilities.	The definition of Class V wells is not included in Wyoming's Class VI regulations at Chapter 24, Water Quality Rules and Regulations (WQRR). However, Wyoming's DEQ WQRR defines Classes I-V at Chapter 13, although Class VI is not included in the definition. Class V facilities are addressed in Ch. 16, but Class VI is not included in the definition.

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<p><i>Class VI.</i> Wells that are not experimental in nature that are used for geologic sequestration of carbon dioxide beneath the lowermost formation containing a USDW; or, wells used for geologic sequestration of carbon dioxide that have been granted a waiver of the injection depth requirements pursuant to requirements at §146.95 of this chapter; or, wells used for geologic sequestration of carbon dioxide that have received an expansion to the areal extent of an existing Class II enhanced oil recovery or enhanced gas recovery aquifer exemption pursuant to §§146.4 of this chapter and 144.7(d).</p>	<p>40 CFR §144.6(f)</p>	<p>Chapter 24 Section 2(j).</p> <p>“Class VI well” means a well injecting a carbon dioxide stream for geologic sequestration. Class VI wells are regulated under this chapter.</p> <p>Chapter 24 Section 3(b).</p> <p>In addition, these regulations shall apply to owners and operators of Class I industrial, Class II, or Class V experimental or demonstration carbon dioxide injection projects who seek to apply for a Class VI geologic sequestration permit for their well or wells.</p> <p>Chapter 24 Section 6(c).</p> <p>The construction of new, or operation or maintenance of any existing Class V wells for non-experimental geologic sequestration is prohibited.</p>	<p>The state regulation does not specify that the Class VI wells inject “beneath the lowermost formation containing a USDW.” The state regulation definitions do not address waivers or wells in an exempted aquifer. Waivers do not need to be addressed since they are optional.</p>

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40 CFR §144.7 Identification of underground sources of drinking water and exempted aquifers.			
The Director may identify (by narrative description, illustrations, maps, or other means) and shall protect as underground sources of drinking water, all aquifers and parts of aquifers which meet the definition of “underground source of drinking water” in §144.3, except to the extent there is an applicable aquifer exemption under paragraph (b) of this section or an expansion to the areal extent of an existing Class II enhanced oil recovery or enhanced gas recovery aquifer exemption for the exclusive purpose of Class VI injection for geologic sequestration under paragraph (d) of this section. Other than EPA approved aquifer exemption expansions that meet the criteria set forth in §146.4(d) of this chapter, new aquifer exemptions shall not be issued for Class VI injection wells. Even if an aquifer has not been specifically identified by the Director, it is an underground source of drinking water if it meets the definition in §144.3.	40 CFR §144.7(a)	NONE	<p>Aquifer exemptions are mentioned in Ch. 13 in reference to Class I wells only.</p> <p>Chapter 8 of Wyoming’s Water Quality rules and Regulations discuss classification of aquifers (http://deq.state.wy.us/wqd/WQDrules/Chapter_08.pdf); Class IV(A) aquifers are those with less than 10,000 TDS and are classified for industrial use. Groundwaters associated with hydrocarbon deposits are considered Class V (hydrocarbon commercial). Section 4(d)(viii) states that a discharge into a Class V Groundwater of the State shall be for the purpose of the production of oil and gas and shall not result in the degradation or pollution or waste of other water resources. Section 5 of Ch. 8 discusses delineation and classification by aquifer and area.</p> <p>Oil and gas regulations (Chapter 3) do not address aquifer exemptions. Need to also look at Wyoming Oil and Gas Commission’s regs, not found in DEQs</p>
The Director may identify (by narrative description, illustrations, maps, or other means) and describe in geographic and/or geometric terms (such as vertical and lateral limits and gradient) which are clear and definite, all aquifers or parts thereof which the Director proposes to designate as exempted aquifers using the criteria in §146.4 of this chapter.	40 CFR §144.7(b)(1)	NONE	See above
No designation of an exempted aquifer submitted as part of a UIC program shall be final until approved by the Administrator as part of a UIC program. No designation of an expansion to the areal extent of a Class II enhanced oil recovery or enhanced gas recovery aquifer exemption for the exclusive purpose of Class VI injection for geologic sequestration shall be final until approved by the Administrator as a revision to the applicable Federal UIC program under part 147 or as a substantial revision of an approved State UIC program in accordance with §145.32 of this chapter. ***	40 CFR §144.7(b)(2)	NONE	See above

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<i>Expansion to the Areal Extent of Existing Class II Aquifer Exemptions for Class VI Wells.</i> Owners or operators of Class II enhanced oil recovery or enhanced gas recovery wells may request that the Director approve an expansion to the areal extent of an aquifer exemption already in place for a Class II enhanced oil recovery or enhanced gas recovery well for the exclusive purpose of Class VI injection for geologic sequestration. Such requests must be treated as a revision to the applicable Federal UIC program under part 147 or as a substantial program revision to an approved State UIC program under §145.32 of this chapter and will not be final until approved by EPA.	40 CFR §144.7(d)	NONE	See above
The owner or operator of a Class II enhanced oil recovery or enhanced gas recovery well that requests an expansion of the areal extent of an existing aquifer exemption for the exclusive purpose of Class VI injection for geologic sequestration must define (by narrative description, illustrations, maps, or other means) and describe in geographic and/or geometric terms (such as vertical and lateral limits and gradient) that are clear and definite, all aquifers or parts thereof that are requested to be designated as exempted using the criteria in §146.4 of this chapter.	40 CFR §144.7(d)(1)	NONE	See above
In evaluating a request to expand the areal extent of an aquifer exemption of a Class II enhanced oil recovery or enhanced gas recovery well for the purpose of Class VI injection, the Director must determine that the request meets the criteria for exemptions in §146.4. In making the determination, the Director shall consider:	40 CFR §144.7(d)(2)	NONE	
Current and potential future use of the USDWs to be exempted as drinking water resources;	40 CFR §144.7(d)(2)(i)	NONE	
The predicted extent of the injected carbon dioxide plume, and any mobilized fluids that may result in degradation of water quality, over the lifetime of the GS project, as informed by computational modeling performed pursuant to §146.84(c)(1), in order to ensure that the proposed injection operation will not at any time endanger USDWs including non-exempted portions of the injection formation;	40 CFR §144.7(d)(2)(ii)	NONE	
Whether the areal extent of the expanded aquifer exemption is of sufficient size to account for any possible revisions to the computational model during reevaluation of the area of review, pursuant to §146.84(e); and	40 CFR §144.7(d)(2)(iii)	NONE	
Any information submitted to support a waiver request made by the owner or operator under §146.95, if appropriate.	40 CFR §144.7(d)(2)(iv)	NONE	
40 CFR §144.8 Noncompliance and program reporting by the Director.			

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All Class VI program reports shall be consistent with reporting requirements set forth in §146.91 of this chapter.	40 CFR §144.8(b)(2)(iii)	NONE	Not needed. NEEDED
SUBPART B--GENERAL PROGRAM REQUIREMENTS			
40 CFR §144.12 Prohibition of movement of fluid into underground sources of drinking water.			
For Class I, II, III, and VI wells, if any water quality monitoring of an underground source of drinking water indicates the movement of any contaminant into the underground source of drinking water, except as authorized under part 146, the Director shall prescribe such additional requirements for construction, corrective action, operation, monitoring, or reporting (including closure of the injection well) as are necessary to prevent such movement.***	40 CFR §144.12(b)	<p>NONE</p> <p>Section 4(c)(ii) In addition to the conditions required of all permits, the administrator may establish, on a case-by-case basis, conditions as required for monitoring, schedules of compliance, and such additional conditions as are necessary to prevent the migration of fluids into underground sources of drinking water.</p> <p>This language is not specific to what those additional requirements are, but throughout DEQ's regs additional requirements are also included as mentioned by Cadmus and in</p> <p>Section 13 (xi) Any additional monitoring, as required by the administrator, necessary to support, upgrade, and improve computational modeling of the area of review re-evaluation required under Section 8(e) and as necessary to demonstrate that there is no movement of fluid containing any contaminant into underground sources of drinking water in exceedence of any primary drinking water regulation under 40 CFR Part 142, or which could otherwise adversely affect human health, safety, or the environment; and</p>	<p>The state regulation does give the administrator authority to require additional or alternative mechanical integrity tests or surface air monitoring and/or soil gas monitoring (at Chapter 24 Section 12(f) and Chapter 24 Section 13(b)(x), respectively). Other types of additional requirements, e.g., corrective action, mentioned in the federal rule are not mentioned.</p> <p>"shall" vs. "may"</p>
40 CFR §144.15 Prohibition of non-experimental Class V wells for geologic sequestration.			
The construction, operation or maintenance of any non-experimental Class V geologic sequestration well is prohibited.	40 CFR §144.15	<p>Chapter 24 Section 6(c).</p> <p>The construction of new, or operation or maintenance of any existing Class V wells for non-experimental geologic sequestration is prohibited.</p>	Same.
40 CFR §144.18 Requirements for Class VI wells.			
Owners or operators of Class VI wells must obtain a permit. Class VI wells cannot be authorized by rule to inject carbon dioxide.	40 CFR §144.18	<p>Chapter 24, Section 4(a)(i).</p> <p>Owners or operators of Class VI wells must obtain a permit in accordance with these regulations. Class VI wells are not authorized by rule to inject.</p>	Similar.

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40 CFR §144.19 Transitioning from Class II to Class VI			
Owners or operators that are injecting carbon dioxide for the primary purpose of long- term storage into an oil and gas reservoir must apply for and obtain a Class VI geologic sequestration permit when there is an increased risk to USDWs compared to Class II operations. In determining if there is an increased risk to USDWs, the owner or operator must consider the factors specified in §144.19(b).	40 CFR §144.19(a)	NONE	The state regulation has a general provision clarifying that a well must switch from complying with oil and gas regulations to geologic sequestration regulations once “the operator converts to geologic sequestration upon the cessation of oil and gas recovery operations” (Chapter 24, Section 1). The state regulation does not elaborate further on the transition from Class II to Class VI or identify factors to consider.
The Director shall determine when there is an increased risk to USDWs compared to Class II operations and a Class VI permit is required. In order to make this determination the Director must consider the following:	40 CFR §144.19(b)	NONE	
Increase in reservoir pressure within the injection zone(s);	40 CFR §144.19(b)(1)	NONE	
Increase in carbon dioxide injection rates;	40 CFR §144.19(b)(2)	NONE	
Decrease in reservoir production rates;	40 CFR §144.19(b)(3)	NONE	
Distance between the injection zone(s) and USDWs;	40 CFR §144.19(b)(4)	NONE	
Suitability of the Class II area of review delineation;	40 CFR §144.19(b)(5)	NONE	
Quality of abandoned well plugs within the area of review;	40 CFR §144.19(b)(6)	NONE	
The owner’s or operator’s plan for recovery of carbon dioxide at the cessation of injection;	40 CFR §144.19(b)(7)	NONE	
The source and properties of injected carbon dioxide; and	40 CFR §144.19(b)(8)	NONE	
Any additional site-specific factors as determined by the Director.	40 CFR §144.19(b)(9)	NONE	

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SUBPART C--AUTHORIZATION OF UNDERGROUND INJECTION BY RULE			
40 CFR §144.22 Existing Class II enhanced recovery and hydrocarbon storage wells.			
Duration of well authorization by rule. Well authorization under this section expires upon the effective date of a permit issued pursuant to §§144.19, 144.25, 144.31, 144.33 or 144.34; after plugging and abandonment in accordance with an approved plugging and abandonment plan pursuant to §§144.28(c) and 146.10 of this chapter; and upon submission of a plugging and abandonment report pursuant to §144.28(k); or upon conversion in compliance with §144.28(j).	40 CFR §144.22(b)	NONE	
SUBPART D--AUTHORIZATION BY PERMIT			
40 CFR §144.31 Application for a permit; authorization by permit.			
Information requirements. All applicants for Class I, II, III, and V permits shall provide the following information to the Director, using the application form provided by the Director. Applicants for Class VI permits shall follow the criteria provided in §146.82 of this chapter.	40 CFR §144.31(e)	NONE	Carbon dioxide storage permits are discussed in Chapter 24, Section 5, WQRR. Cross check with 146.82 to ensure that all the criteria are provided
40 CFR §144.33 Area permits.			
Used to inject other than hazardous waste; and	40 CFR §144.33(a)(4)	Chapter 24, Section 4(a)(vi). Permits may be issued for individual Class VI wells or they may be issued on an area basis for multiple points of discharge operated by the same person.	The state regulations allow area permits, which are not allowed in the federal rule.
Other than Class VI wells.	40 CFR §144.33(a)(5)	Chapter 24, Section 4(a)(vi).	The state regulations allow area permits.

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40 CFR §144.36 Duration of permits.			
<p>Permits for Class I and V wells shall be effective for a fixed term not to exceed 10 years. UIC permits for Class II and III wells shall be issued for a period up to the operating life of the facility. UIC permits for Class VI wells shall be issued for the operating life of the facility and the post-injection site care period. The Director shall review each issued Class II, III, and VI well UIC permit at least once every 5 years to determine whether it should be modified, revoked and reissued, terminated or a minor modification made as provided in §§144.39, 144.40, or 144.41.</p>	<p>40 CFR §144.36(a)</p>	<p>Chapter 24, Section 4(a)(v).</p> <p>Permits for Class VI wells shall be issued for the operating life of the facility and extend through the post-injection site care period until the geologic sequestration project is closed in accordance with department rules and regulations.</p> <p>Chapter 24, Section 4(a)(vii).</p> <p>Each permit shall be reviewed by the department at least once every five (5) years for continued validity of all permit conditions and contents. Permits that do not satisfy the requirements of these regulations are subject to modification, revocation and reissuance, or termination pursuant to this chapter.</p>	<p>Similar.</p>
40 CFR §144.38 Transfer of permits.			
<p>Automatic transfers. As an alternative to transfers under paragraph (a) of this section, any UIC permit for a well not injecting hazardous waste or injecting carbon dioxide for geologic sequestration may be automatically transferred to a new permittee if:</p>	<p>40 CFR §144.38(b)</p>	<p>Chapter 24, Section 4(b)(xv).</p> <p>Transfer of a permit is allowed only upon approval by the administrator. When a permit transfer occurs pursuant to this section, the permit rights of the previous permittee will automatically terminate.</p> <p>The proposed permit holder shall apply in writing as though that person was the original applicant for the permit and shall further agree to be bound by all of the terms and conditions of the permit; and</p> <p>Transfer will not be allowed if the permittee is in noncompliance with any term and conditions of the permit, unless the transferee agrees to bring the facility back into compliance with the permit.</p> <p>When a permit transfer occurs, the administrator may modify a permit pursuant to this section. The administrator shall provide public notice pursuant to Section 19 for any modification other than a minor modification defined by this section.</p>	<p>Similar. Neither the state regulation nor the federal rule allows for an automatic transfer of Class VI permits.</p>

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40 CFR §144.39 Modification or revocation and reissuance of permits.			
*** For Class I hazardous waste injection wells, Class II, Class III or Class VI wells the following may be causes for revocation and reissuance as well as modification; and for all other wells the following may be cause for revocation or reissuance as well as modification when the permittee requests or agrees. ***	40 CFR §144.39(a)	<p>Chapter 24, Section 4(b)(viii).</p> <p>Permits may be modified, revoked and reissued, or terminated either in response to a petition from any interested person (including the permittee) or upon the administrator's initiative. However, permits may only be modified, revoked and reissued, or terminated for the reasons specified in Section 4(b) of this chapter. All requests shall be in writing and shall contain facts or reasons supporting the request.</p> <p>If the administrator decides the petition is not justified, the petitioner shall be sent a brief written response giving the reason for the decision. A request for modification, revocation and reissuance, or termination shall be considered denied if the administrator takes no action within 60 days after receiving the written request. Denials of requests for modification, revocation and reissuance, or termination are not subject to public notice and comment. Denials by the administrator may be appealed for hearing to the Environmental Quality Council by a letter briefly setting forth the relevant facts.</p>	See below.
*** Permits other than for Class I hazardous waste injection wells, Class II, Class III or Class VI wells may be modified during their permit terms for this cause only as follows: ***	40 CFR §144.39(a)(3)	NONE	Not needed.
<i>Basis for modification of Class VI permits.</i> Additionally, for Class VI wells, whenever the Director determines that permit changes are necessary based on:	40 CFR §144.39(a)(5)	<p>Chapter 24, Section 4(b)(ix).</p> <p>The administrator may modify a permit when:</p>	Same.

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Area of review reevaluations under §146.84(e)(1) of this chapter;	40 CFR §144.39(a)(5)(i)	<p>Chapter 24, Section 4(b)(ix)(A) – (F).</p> <p>(A) Any material or substantial alterations or additions to the facility occur after permitting or licensing, which justify the application of permit conditions that are different or absent in the existing permit;</p> <p>(B) Any modification in the operation of the facility is capable of causing or increasing pollution in excess of applicable standards or permit conditions;</p> <p>(C) Information warranting modification is discovered after the operation has begun that would have justified the application of different permit conditions at the time of permit issuance;</p> <p>(D) Regulations or standards upon which the permit was based have changed by promulgation of amended standards or regulations, or by judicial decision after the permit was issued;</p> <p>(E) Cause exists for termination, as described in this section, but the department determines that modification is appropriate; or</p> <p>(F) Modification is necessary to comply with applicable statutes, standards or regulations.</p>	<p>It is not clear whether area of review reevaluations, a review of monitoring and/or testing results, or plan updates are equivalent to the possible reasons for modifications described in the state regulation (which does not specifically identify these as causes for modification to the permit). The state regulation never mentions that plan updates are required to be incorporated into the permit. AND needs to include a modification is required</p> <p>How is pollution defined?</p>
Any amendments to the testing and monitoring plan under §146.90(j) of this chapter;	40 CFR §144.39(a)(5)(ii)	Chapter 24, Section 4(b)(ix)(A) – (F).	See above. §146
Any amendments to the injection well plugging plan under §146.92(c) of this chapter;	40 CFR §144.39(a)(5)(iii)	Chapter 24, Section 4(b)(ix)(A) – (F).	See above. §146
Any amendments to the post-injection site care and site closure plan under §146.93(a)(3) of this chapter;	40 CFR §144.39(a)(5)(iv)	Chapter 24, Section 4(b)(ix)(A) – (F).	See above. §146
Any amendments to the emergency and remedial response plan under §146.94(d) of this chapter; or	40 CFR §144.39(a)(5)(v)	Chapter 24, Section 4(b)(ix)(A) – (F).	See above. §146
A review of monitoring and/or testing results conducted in accordance with permit requirements.	40 CFR §144.39(a)(5)(vi)	Chapter 24, Section 4(b)(ix)(A) – (F).	See above. §146

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40 CFR §144.41 Minor modifications of permits.			
Amend a Class VI injection well testing and monitoring plan, plugging plan, post-injection site care and site closure plan, or emergency and remedial response plan where the modifications merely clarify or correct the plan, as determined by the Director.	40 CFR §144.41(h)	<p>Chapter 24, Section 4(b)(x).</p> <p>Minor modifications of permits may occur with the consent of the permittee without following the public notice requirements. Minor modifications will become final 20 days from the date of receipt of such notice. For the purposes of this chapter, minor modifications may only:</p> <ul style="list-style-type: none"> -Correct typographical errors; -Require more frequent monitoring or reporting by the permittee; -Change an interim compliance date in a schedule of compliance, provided the new date is not more than 120 days after the date specified in the existing permit and does not interfere with attainment of the final compliance date requirement; -Allow for a change in ownership or operational control of a facility where the administrator determines that no other change in the permit is necessary, provided that a written agreement containing a specific date for transfer of permit responsibility, coverage, and liability between the current and new permittees have been submitted to the administrator; -Change quantities or types of fluids injected which are within the capacity of the facility as permitted and, in the judgment of the administrator, would not interfere with the operation of the facility or its ability to meet conditions described in the permit and would not change its classification; or -Change construction requirements approved by the administrator pursuant to department rules and regulations provided that any such alteration shall comply with the requirements of this chapter. 	<p>Minor modifications appear to apply to more significant actions/events (i.e., more than clarifications or corrections of the plans) in the state regulation than the federal rule. The state regulation includes more frequent monitoring or reporting, a change in the quantities or types of fluids injected, and construction requirement changes as minor modifications.</p> <p>These conditions correspond to those already found in 144.41</p> <p>Need to include</p>

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SUBPART E--PERMIT CONDITIONS			
40 CFR §144.51 Conditions applicable to all permits.			
Owners or operators of Class VI wells shall retain records as specified in subpart H of part 146, including §§146.84(g), 146.91(f), 146.92(d), 146.93(f), and 146.93(h) of this chapter.	40 CFR §144.51(j)(4)	NONE	Not needed. NEED , but if each of the individual sections are accounted for, then okay Note, however, the state regulation has limited recordkeeping requirements (see 40 CFR 146.91 section of crosswalk).
A Class I, II or III permit shall include and a Class V permit may include conditions which meet the applicable requirements of §146.10 of this chapter to ensure that plugging and abandonment of the well will not allow the movement of fluids into or between USDWs. Where the plan meets the requirements of §146.10 of this chapter, the Director shall incorporate the plan into the permit as a permit condition. Where the Director's review of an application indicates that the permittee's plan is inadequate, the Director may require the applicant to revise the plan, prescribe conditions meeting the requirements of this paragraph, or deny the permit. A Class VI permit shall include conditions which meet the requirements set forth in §146.92 of this chapter. Where the plan meets the requirements of §146.92 of this chapter, the Director shall incorporate it into the permit as a permit condition. For purposes of this paragraph, temporary or intermittent cessation of injection operations is not abandonment.	40 CFR §144.51(o)	NONE	Not needed, except for the requirement that plugging plan be incorporated into the permit. Plugging requirements are addressed in Chapter 24, Section 15, WQRR (see 40 CFR 146.92 in this crosswalk). NEED
The owner or operator of a Class I, II, III or VI well permitted under this part shall establish mechanical integrity prior to commencing injection or on a schedule determined by the Director. Thereafter the owner or operator of Class I, II, and III wells must maintain mechanical integrity as defined in §146.8 of this chapter and the owner or operator of Class VI wells must maintain mechanical integrity as defined in §146.89 of this chapter. ***	40 CFR §144.51(q)(1)	Chapter 24, Section 4(c)(i)(X). All individual permits issued under this chapter shall contain the following conditions: A requirement that the owner or operator of a Class VI well permitted under this part shall establish mechanical integrity prior to commencing injection or on a schedule determined by the administrator. Thereafter, the owner or operator of Class VI wells must maintain mechanical integrity as defined in Section 12 of this chapter.	Same. MIT requirements are further addressed in Chapter 24, Section 12, WQRR (see 40 CFR 146.89 in this crosswalk).
When the Director determines that a Class I, II, III or VI well lacks mechanical integrity pursuant to §§146.8 or 146.89 of this chapter for Class VI of this chapter, he/she shall give written notice of his/her determination to the owner or operator. ***	40 CFR §144.51(q)(2)	Chapter 24, Section 4(c)(i)(Y). All individual permits issued under this chapter shall contain the following conditions: A requirement that when the administrator determines that a Class VI well lacks mechanical integrity pursuant to Section 12 of this chapter, he/she shall give written notice of his/her determination to the owner or operator.	Same. Although this should be a requirement, it's not clear that this needs to be a permit condition since it is something the administrator rather than the operator must do.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
40 CFR §144.52 Establishing permit conditions.			
In addition to conditions required in §144.51, the Director shall establish conditions, as required on a case-by-case basis under §144.36 (duration of permits), §144.53(a) (schedules of compliance), §144.54 (monitoring), and for EPA permits only §144.53(b) (alternate schedules of compliance), and §144.4 (considerations under Federal law). Permits for owners or operators of hazardous waste injection wells shall include conditions meeting the requirements of §144.14 (requirements for wells injecting hazardous waste), paragraphs (a)(7) and (a)(9) of this section, and subpart G of part 146. Permits for owners or operators of Class VI injection wells shall include conditions meeting the requirements of subpart H of part 146. Permits for other wells shall contain the following requirements, when applicable.	40 CFR §144.52(a)	Chapter 24, Section 4(c)(ii). In addition to the conditions required of all permits, the administrator may establish, on a case-by-case basis, conditions as required for monitoring, schedules of compliance, and such additional conditions as are necessary to prevent the migration of fluids into underground sources of drinking water. "shall" vs. "may"	Similar. The state regulation includes further information on permit conditions for carbon dioxide storage facilities at Chapter 24, Section 5, WQRR (see 40 CFR 146.82 in this crosswalk).
Corrective action as set forth in §§144.55, 146.7, and 146.84 of this chapter.	40 CFR §144.52(a)(2)	NONE	Not needed. Corrective action requirements are addressed in Chapter 24, Section 8, WQRR (see 40 CFR 146.84 in this crosswalk).
The well has been plugged and abandoned in accordance with an approved plugging and abandonment plan pursuant to §§144.51(o), 146.10, and 146.92 of this chapter, and submitted a plugging and abandonment report pursuant to §144.51(p); or	40 CFR §144.52(a)(7)(i)(A)	NONE	Not needed. Well plugging requirements are addressed in Chapter 24, Section 15, WQRR (see 40 CFR 146.92 in this crosswalk). Post injection site care and site closure requirements are addressed in Chapter 24, Section 16, WQRR (see 40 CFR 146.93 in this crosswalk).
The permittee shall show evidence of such financial responsibility to the Director by the submission of a surety bond, or other adequate assurance, such as a financial statement or other materials acceptable to the Director. For EPA administered programs, the Regional Administrator may on a periodic basis require the holder of a lifetime permit to submit an estimate of the resources needed to plug and abandon the well revised to reflect inflation of such costs, and a revised demonstration of financial responsibility, if necessary. The owner or operator of a well injecting hazardous waste must comply with the financial responsibility requirements of subpart F of this part. For Class VI wells, the permittee shall show evidence of such financial responsibility to the Director by the submission of a qualifying instrument (see §146.85(a) of this chapter), such as a financial statement or other materials acceptable to the Director. The owner or operator of a Class VI well must comply with the financial responsibility requirements set forth in §146.85 of this chapter.	40 CFR §144.52(a)(7)(ii)	NONE	Not needed The demonstration of financial responsibility is addressed in greater detail in Chapter 24, Section 18, WQRR (see 40 CFR 146.85 in this crosswalk).

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
<i>Mechanical integrity.</i> A permit for any Class I, II, III or VI well or injection project which lacks mechanical integrity shall include, and for any Class V well may include, a condition prohibiting injection operations until the permittee shows to the satisfaction of the Director under §§146.8, or 146.89 for Class VI, that the well has mechanical integrity.	40 CFR §144.52(a)(8)	Chapter 24, Section 4(c)(i)(Z). All individual permits issued under this chapter shall contain the following conditions: A requirement that, for any Class VI well which lacks mechanical integrity, injection operations are prohibited until the permittee shows to the satisfaction of the administrator under Section 12 that the well has mechanical integrity.	Same. MIT requirements are further addressed in Chapter 24, Section 12, WQRR (see 40 CFR 146.89 in this crosswalk).
SUBPART G--REQUIREMENTS FOR OWNERS AND OPERATORS OF CLASS V INJECTION WELLS			
40 CFR §144.80 What is a Class V injection well?			
<i>Class V.</i> Injection wells not included in Class I, II, III, IV or VI. ***	40 CFR §144.80(e)	Chapter 13, Section 2(k) "Class V well" means any injection well not included in Classes I, II, III, or IV. Chapter 16, Section 1(e) "Class V facility" means any property which contains an injection well, drywell, or subsurface fluid distribution system which is not defined as a Class I, II, III, or IV well in Chapter 13, Water Quality Rules and Regulations. The Class V facility includes all systems of collection, treatment, and control which are associated with the subsurface disposal. Appendix A of this chapter contains a list of Class V facilities.	The definition of Class V wells is not included in Wyoming's Class VI regulations at Chapter 24, Water Quality Rules and Regulations (WQRR). However, Wyoming's DEQ WQRR defines Classes I-V at Chapter 13, although Class VI is not included in the definition. Class V facilities are addressed in Ch. 16, but Class VI is not included in that definition.
<i>Class VI.</i> Wells used for geologic sequestration of carbon dioxide beneath the lowermost formation containing a USDW, except those wells that are experimental in nature; or, wells used for geologic sequestration of carbon dioxide that have been granted a waiver of the injection depth requirements pursuant to requirements at §146.95 of this chapter; or, wells used for geologic sequestration of carbon dioxide that have received an expansion to the areal extent of a existing Class II enhanced oil recovery or enhanced gas recovery aquifer exemption pursuant to §§146.4 of this chapter and 144.7(d).	40 CFR §144.80(f)	Chapter 24 Section 2(j). "Class VI well" means a well injecting a carbon dioxide stream for geologic sequestration. Class VI wells are regulated under this chapter. Chapter 24 Section 3(b). In addition, these regulations shall apply to owners and operators of Class I industrial, Class II, or Class V experimental or demonstration carbon dioxide injection projects who seek to apply for a Class VI geologic sequestration permit for their well or wells. Chapter 24 Section 6(c). The construction of new, or operation or maintenance of any existing Class V wells for non-experimental geologic sequestration is prohibited.	The state regulation does not specify that the Class VI wells inject "beneath the lowermost formation containing a USDW." The state regulation definitions do not address waivers or wells in an exempted aquifer. Waivers do not need to be addressed since they are optional.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
PART 146--UNDERGROUND INJECTION CONTROL PROGRAM: CRITERIA AND STANDARDS			
SUBPART A--GENERAL PROVISIONS			
40 CFR §146.4 Criteria for exempted aquifers.			
An aquifer or a portion thereof which meets the criteria for an “underground source of drinking water” in §146.3 may be determined under §144.7 of this chapter to be an “exempted aquifer” for Class I-V wells if it meets the criteria in paragraphs (a) through (c) of this section. Class VI wells must meet the criteria under paragraph (d) of this section:	40 CFR §146.4	NONE	<p>The state regulation (Ch. 24) does not mention exempted aquifers or the criteria for exempted aquifers.</p> <p>Aquifer exemptions are mentioned in Ch. 13 in reference to Class I wells only.</p> <p>Chapter 8 of Wyoming’s Water Quality rules and Regulations discuss classification of aquifers (http://deq.state.wy.us/wqd/WQDrules/Chapter08.pdf); Class IV(A) aquifers are those with less than 10,000 TDS and are classified for industrial use. Groundwaters associated with hydrocarbon deposits are considered Class V (hydrocarbon commercial). Section 4(d)(viii) states that a discharge into a Class V Groundwater of the State shall be for the purpose of the production of oil and gas and shall not result in the degradation or pollution or waste of other water resources. Section 5 of Ch. 8 discusses delineation and classification by aquifer and area.</p> <p>Oil and gas regulations (Chapter 3) do not address aquifer exemptions.</p>
The areal extent of an aquifer exemption for a Class II enhanced oil recovery or enhanced gas recovery well may be expanded for the exclusive purpose of Class VI injection for geologic sequestration under §144.7(d) of this chapter if it meets the following criteria:	40 CFR §146.4(d)	NONE	See above.
It does not currently serve as a source of drinking water; and	40 CFR §146.4(d)(1)	NONE	See above.
The total dissolved solids content of the ground water is more than 3,000 mg/l and less than 10,000 mg/l; and	40 CFR §146.4(d)(2)	NONE	See above.
It is not reasonably expected to supply a public water system.	40 CFR §146.4(d)(3)	NONE	See above.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
40 CFR §146.5 Classification of injection wells.			
<p><i>Class V.</i> Injection wells not included in Class I, II, III, IV or VI. ***</p>	40 CFR §146.5(e)	<p>Chapter 13, Section 2(k)</p> <p>"Class V well" means any injection well not included in Classes I, II, III, or IV.</p> <p>Chapter 16, Section 1(e)</p> <p>"Class V facility" means any property which contains an injection well, drywell, or subsurface fluid distribution system which is not defined as a Class I, II, III, or IV well in Chapter 13, Water Quality Rules and Regulations. The Class V facility includes all systems of collection, treatment, and control which are associated with the subsurface disposal. Appendix A of this chapter contains a list of Class V facilities.</p>	<p>The definition of Class V wells is not included in Wyoming's Class VI regulations at Chapter 24, Water Quality Rules and Regulations (WQRR). However, Wyoming's DEQ WQRR defines Classes I-V at Chapter 13, although Class VI is not included in the definition. Class V facilities are addressed in Ch. 16, but Class VI is not included in the definition.</p>
<p><i>Class VI.</i> Wells that are not experimental in nature that are used for geologic sequestration of carbon dioxide beneath the lowermost formation containing a USDW; or, wells used for geologic sequestration of carbon dioxide that have been granted a waiver of the injection depth requirements pursuant to requirements at §146.95; or, wells used for geologic sequestration of carbon dioxide that have received an expansion to the areal extent of an existing Class II enhanced oil recovery or enhanced gas recovery aquifer exemption pursuant to §§146.4 of this chapter and 144.7(d).</p>	40 CFR §146.5(f)	<p>Chapter 24 Section 2(j).</p> <p>"Class VI well" means a well injecting a carbon dioxide stream for geologic sequestration. Class VI wells are regulated under this chapter.</p> <p>Chapter 24 Section 3(b).</p> <p>In addition, these regulations shall apply to owners and operators of Class I industrial, Class II, or Class V experimental or demonstration carbon dioxide injection projects who seek to apply for a Class VI geologic sequestration permit for their well or wells.</p> <p>Chapter 24 Section 6(c).</p> <p>The construction of new, or operation or maintenance of any existing Class V wells for non-experimental geologic sequestration is prohibited.</p>	<p>The state regulation does not specify that the Class VI wells inject "beneath the lowermost formation containing a USDW." The state regulation definitions do not address waivers or wells in an exempted aquifer. Waivers do not need to be addressed since they are optional.</p>

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
SUBPART H--CRITERIA AND STANDARDS APPLICABLE TO CLASS VI WELLS			
40 CFR §146.81 Applicability.			
This subpart establishes criteria and standards for underground injection control programs to regulate any Class VI carbon dioxide geologic sequestration injection wells.	40 CFR §146.81(a)	<p>Chapter 24 Section 1.</p> <p>These regulations are promulgated pursuant to W.S. 35-11-101 through 1904, specifically 313, and no person shall sequester carbon dioxide unless authorized by an Underground Injection Control (UIC) permit issued by the Department of Environmental Quality (DEQ). The injection of carbon dioxide for purposes of a project for enhanced recovery of oil or other minerals approved by the Wyoming Oil and Gas Conservation Commission shall not be subject to the provisions of this regulation unless the operator converts to geologic sequestration upon the cessation of oil and gas recovery operations.</p> <p>Chapter 24 Section 3. Applicability.</p> <p>(a) These regulations shall apply to all Class VI wells used to inject carbon dioxide streams for the purpose of geologic sequestration.</p>	Similar.
This subpart applies to any wells used to inject carbon dioxide specifically for the purpose of geologic sequestration, i.e., the long-term containment of a gaseous, liquid, or supercritical carbon dioxide stream in subsurface geologic formations.	40 CFR §146.81(b)	<p>Chapter 24 Section 3(a).</p> <p>(a) These regulations shall apply to all Class VI wells used to inject carbon dioxide streams for the purpose of geologic sequestration.</p> <p>Chapter 24 Section 3(c).</p> <p>(c) These regulations do not apply to the injection of any carbon dioxide stream that meets the definition of a hazardous waste.</p>	Similar. Note that the state regulation does not explicitly reference “long-term” containment of the CO ₂ .

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
This subpart also applies to owners or operators of permit- or rule-authorized Class I, Class II, or Class V experimental carbon dioxide injection projects who seek to apply for a Class VI geologic sequestration permit for their well or wells. Owners or operators seeking to convert existing Class I, Class II, or Class V experimental wells to Class VI geologic sequestration wells must demonstrate to the Director that the wells were engineered and constructed to meet the requirements at §146.86(a) and ensure protection of USDWs, in lieu of requirements at §§146.86(b) and 146.87(a). By December, 10, 2011, owners or operators of either Class I wells previously permitted for the purpose of geologic sequestration or Class V experimental technology wells no longer being used for experimental purposes that will continue injection of carbon dioxide for the purpose of GS must apply for a Class VI permit. A converted well must still meet all other requirements under part 146.	40 CFR §146.81(c)	Chapter 24 Section 3(b). (b) In addition, these regulations shall apply to owners and operators of Class I industrial, Class II, or Class V experimental or demonstration carbon dioxide injection projects who seek to apply for a Class VI geologic sequestration permit for their well or wells. (i) If the administrator determines that USDWs will not be endangered, such wells are exempt, at the administrator's discretion, from the casing and cementing requirements at Section 9(b)(i) through (vii) and Section 10(a)(i)(A) through (C). LESS STRINGENT	Similar. However, the state regulation does not include a permitting deadline for owners or operators of Class I or V wells to apply for a Class VI permit. In addition, the standards for converting an existing well to Class VI are less stringent in the state regulation. The state regulation does not require owners/operators to demonstrate that converted wells are constructed to achieve the goals of 40 CFR 146.86 and 146.87.
<i>Definitions.</i> The following definitions apply to this subpart. To the extent that these definitions conflict with those in §§144.3 or 146.3 of this chapter these definitions govern for Class VI wells:	40 CFR §146.81(d)	Chapter 24 Section 2. Definitions The following definitions supplement those definitions contained in Section 35-11-103 of the Wyoming Environmental Quality Act.	
<i>Area of review</i> means the region surrounding the geologic sequestration project where USDWs may be endangered by the injection activity. The area of review is delineated using computational modeling that accounts for the physical and chemical properties of all phases of the injected carbon dioxide stream and displaced fluids, and is based on available site characterization, monitoring, and operational data as set forth in §146.84.	40 CFR §146.81(d)	Chapter 24 Section 2(c). “Area of review” means the subsurface three-dimensional extent of the carbon dioxide plume, associated pressure front, and displaced fluids, as well as the overlying formations and surface area above that delineated region. Chapter 24 Section 8(a). The area of review is based on computational modeling that accounts for the physical and chemical properties of all phases of the injected carbon dioxide stream.	The state definition of AoR does not specifically say that the AoR is delineated using computational modeling. However, other sections of the rule (Section 8) address the parts that are missing (e.g., AoR is based on computational modeling; modeling is based on geologic and operating data). See additional discussion under 146.84, below. However, the state regulation does not explicitly include the general meaning of the area of review, i.e., that the area of review means the region surrounding the geologic sequestration project where USDWs may be endangered by the injection activity.
<i>Carbon dioxide plume</i> means the extent underground, in three dimensions, of an injected carbon dioxide stream.	40 CFR §146.81(d)	Chapter 24 Section 2(f). “Carbon dioxide plume” means the underground extent, in three dimensions, of an injected carbon dioxide stream.	Same.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
<i>Carbon dioxide stream</i> means carbon dioxide that has been captured from an emission source (e.g., a power plant), plus incidental associated substances derived from the source materials and the capture process, and any substances added to the stream to enable or improve the injection process. This subpart does not apply to any carbon dioxide stream that meets the definition of a hazardous waste under 40 CFR part 261.	40 CFR §146.81(d)	Chapter 24 Section 2(g). “Carbon dioxide stream” means carbon dioxide, plus associated substances derived from the source materials and any processing, and any substances added to the stream to enable or improve the injection process. This chapter does not apply to any carbon dioxide stream that meets the definition of a hazardous waste under 40 CFR Part 261.	Similar.
<i>Confining zone</i> means a geologic formation, group of formations, or part of a formation stratigraphically overlying the injection zone(s) that acts as barrier to fluid movement. For Class VI wells operating under an injection depth waiver, confining zone means a geologic formation, group of formations, or part of a formation stratigraphically overlying and underlying the injection zone(s).	40 CFR §146.81(d)	Chapter 24 Section 2(k). “Confining zone” means a geological formation, group of formations, or part of a formation that is capable of limiting fluid movement from an injection zone.	The state regulation does not explicitly say that the confining zone is “stratigraphically overlying the injection zone(s).” The absence of this phrase means that the state regulation may be interpreted as allowing injection above USDWs (this might be acceptable if the rule had a provision banning injection above USDWs without a waiver, but there is no such provision). The state regulation also makes no mention of an injection depth waiver, which is optional.
<i>Corrective action</i> means the use of Director-approved methods to ensure that wells within the area of review do not serve as conduits for the movement of fluids into underground sources of drinking water (USDW).	40 CFR §146.81(d)	Chapter 24 Section 2(l). “Corrective action” means the use of administrator-approved methods to ensure that wells within the area of review do not serve as conduits for the movement of fluids into geologic formations other than those to be authorized under the permit.	Similar. However, the state regulation uses different language in its definition of corrective action, i.e., “into geologic formations other than those to be authorized under the permit” in state regulation vs. “into USDWs” in federal rule.
<i>Geologic sequestration</i> means the long-term containment of a gaseous, liquid, or supercritical carbon dioxide stream in subsurface geologic formations. This term does not apply to carbon dioxide capture or transport.	40 CFR §146.81(d)	W.S. 35-11-103(c)(xx). "Geologic sequestration" means the injection of carbon dioxide and associated constituents into subsurface geologic formations intended to prevent its release into the atmosphere.	While the state regulation says that geologic sequestration is intended “to prevent [the carbon dioxide’s] release into the atmosphere,” it does not explicitly say this containment is “long-term.” The state regulation says that geologic sequestration means the injection of “carbon dioxide and associated constituents” rather than of the “gaseous, liquid, or supercritical carbon dioxide stream.” The carbon dioxide stream, as defined at Chapter 24 Section 2(g), includes not only carbon dioxide and associated substances, but also any substances added to the stream to enable or improve the injection process. However, the state regulation does not clarify that geologic sequestration includes all phases of carbon dioxide (e.g., gaseous, liquid, or supercritical).

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
<p><i>Geologic sequestration project</i> means an injection well or wells used to emplace a carbon dioxide stream beneath the lowermost formation containing a USDW; or, wells used for geologic sequestration of carbon dioxide that have been granted a waiver of the injection depth requirements pursuant to requirements at §146.95; or, wells used for geologic sequestration of carbon dioxide that have received an expansion to the areal extent of an existing Class II enhanced oil recovery or enhanced gas recovery aquifer exemption pursuant to §§146.4 of this chapter and 144.7(d). It includes the subsurface three-dimensional extent of the carbon dioxide plume, associated area of elevated pressure, and displaced fluids, as well as the surface area above that delineated region.</p>	<p>40 CFR §146.81(d)</p>	<p>Chapter 24 Section 2(t).</p> <p>“Geologic sequestration project” means an injection well or wells used to emplace a carbon dioxide stream into an injection zone for geologic sequestration. It includes the subsurface three-dimensional extent of the carbon dioxide plume, associated pressure front, and displaced brine, as well as the surface area above that delineated region.</p>	<p>The state regulation is less specific/stringent when it defines a geologic sequestration project as emplacing a carbon dioxide stream into “an injection zone for geologic sequestration,” rather than “beneath the lowermost formation containing a USDW.”</p> <p>Additionally, the state regulation does not mention an injection depth waiver, which is optional and not necessary to add, and it does not explicitly address wells in expanded exempted aquifers.</p> <p>These omissions might be acceptable if the rule had a provision elsewhere specifying that injection must occur below the lowermost USDW unless a waiver has been approved. Currently there is no such provision.</p> <p>Also the state rule refers to the “associated pressure front, and displaced brine,” rather than the “area of elevated pressure, and displaced fluids.” OKAY</p>
<p><i>Injection zone</i> means a geologic formation, group of formations, or part of a formation that is of sufficient areal extent, thickness, porosity, and permeability to receive carbon dioxide through a well or wells associated with a geologic sequestration project.</p>	<p>40 CFR §146.81(d)</p>	<p>Chapter 24 Section 2(z).</p> <p>“Injection zone” means a geologic formation, group of formations, or part of a formation receiving fluids through a well.</p>	<p>Similar, but the state regulation does not specify that the formation must have sufficient areal extent, thickness, porosity, and permeability to receive the CO₂ (i.e., to demonstrate sufficient capacity).</p>
<p><i>Post-injection site care</i> means appropriate monitoring and other actions (including corrective action) needed following cessation of injection to ensure that USDWs are not endangered, as required under §146.93.</p>	<p>40 CFR §146.81(d)</p>	<p>Chapter 24 Section 2(ii).</p> <p>“Post-injection site care” means monitoring, measurement, verification, and other actions (including corrective action) following cessation of injection, as required under Section 16 of this chapter.</p>	<p>Similar. The state’s definition of post-injection site care does not refer to the purpose of ensuring that USDWs are not endangered. However, the state regulation does reference Section 16(b)(iii) (Post-injection site care and site closure), i.e., “prior to authorization for site closure, the owner or operator must demonstrate to the Director, based on monitoring, other site-specific data, and modeling that is reasonably consistent with site performance, that no additional monitoring is needed to ensure that the geologic sequestration project does not, and is not expected to pose an endangerment to a USDW or otherwise threaten human health, safety, or the environment.”</p>

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
<i>Pressure front</i> means the zone of elevated pressure that is created by the injection of carbon dioxide into the subsurface. For the purposes of this subpart, the pressure front of a carbon dioxide plume refers to a zone where there is a pressure differential sufficient to cause the movement of injected fluids or formation fluids into a USDW.	40 CFR §146.81(d)	Chapter 24 Section 2(jj). “Pressure front” means the zone of elevated pressure that is created by the injection of the carbon dioxide stream into the subsurface. The pressure front of a carbon dioxide plume refers to a zone where there is a pressure differential sufficient to cause movement of injected fluids or formation fluid if a migration pathway or conduit were to exist.	Similar.
<i>Site closure</i> means the point/time, as determined by the Director following the requirements under §146.93, at which the owner or operator of a geologic sequestration site is released from post-injection site care responsibilities.	40 CFR §146.81(d)	Chapter 24 Section 2(pp). “Site closure” means the point/time, as determined by the director, at which the owner or operator of a geologic sequestration project is released from post-injection site care responsibilities.	Same. Need to include Standards @ 146.93
<i>Transmissive fault or fracture</i> means a fault or fracture that has sufficient permeability and vertical extent to allow fluids to move between formations.	40 CFR §146.81(d)	Chapter 24 Section 2(rr). “Transmissive fault or fracture” means a fault or fracture that has sufficient permeability and vertical extent to allow fluids to move beyond the confining zone.	Similar; note that the state regulation references movement “beyond the confining zone” and not “between formations” (in the federal language).
40 CFR §146.82 Required Class VI permit information.			
This section sets forth the information which must be considered by the Director in authorizing Class VI wells. For converted Class I, Class II, or Class V experimental wells, certain maps, cross-sections, tabulations of wells within the area of review and other data may be included in the application by reference provided they are current, readily available to the Director, and sufficiently identified to be retrieved. In cases where EPA issues the permit, all the information in this section must be submitted to the Regional Administrator.	40 CFR §146.82	Chapter 24 Section 5(a). It is the operator's responsibility to make application for and obtain a permit in accordance with these regulations. Each application must be submitted with all supporting data.	Similar.
Prior to the issuance of a permit for the construction of a new Class VI well or the conversion of an existing Class I, Class II, or Class V well to a Class VI well, the owner or operator shall submit, pursuant to §146.91(e), and the Director shall consider the following:	40 CFR §146.82(a)	Chapter 24 Section 4(a)(iv). A separate permit to construct is not required under Chapter 3, Water Quality Rules and Regulations for any Class VI facility.	The state regulation does not explicitly separate the permit application information into two phases (pre-construction and post-construction/pre-operation) like the federal rule does.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Information required in §144.31 (e)(1) through (6) of this chapter;	40 CFR §146.82(a)(1)	<p>Chapter 24 Section 5(b)(i-v).</p> <p>-A brief description of the nature of the business and the activities to be conducted that require the applicant to obtain a permit under this chapter.</p> <p>-The name, address and telephone number of the operator, and the operator's ownership status and status as a Federal, State, private, public or other entity.</p> <p>-Up to four SIC codes which best reflect the principal products or services provided by the facility.</p> <p>-The name, address, and telephone number of the facility. Additionally, the location of the geologic sequestration project shall be identified by section, township, range and county, noting which, if any, sections include Indian lands.</p> <p>-Within the area of review, a listing and status of all permits or construction approvals associated with the geologic sequestration project received or applied for by the applicant under any of the following programs: RCRA; UIC Program under SDWA; NPDES under CWA; PSD program under CAA; NESHAPs pre-construction approval under CAA; Dredge and fill permits under section 404 of CWA; Within the area of review, a list of other relevant permits, whether federal or state, associated with the geologic sequestration project that the applicant has been required to obtain, such as construction permits. This includes a statement as to whether or not the facility is within a state approved water quality management plan area, a state approved wellhead protection area or a state approved source water protection area.</p>	<p>The federal rule includes the following, which the state regulation does not:</p> <p>-40 CFR 144.31(e)(1): The activities conducted by the applicant which require it to obtain permits under RCRA, UIC, the National Pollution Discharge Elimination system (NPDES) program under the Clean Water Act, or the Prevention of Significant Deterioration (PSD) program under the Clean Air Act. [The state regulation asks for a list of permits, whereas the federal rule asks for a description of the associated activities; this may be acceptable.]</p> <p>-40 CFR 144.31(e)(5): Whether the facility is located on Indian lands. [Not necessary, as facilities on Indian lands will be regulated by EPA Regions or tribes that gain primacy.]</p> <p>-40 CFR 144.31(e)(6)(v)&(vii): A listing of all permits or construction approvals received or applied for under any of the following programs: (v) Nonattainment program under CAA (vii) Ocean dumping permits under the Marine Protection Research and Sanctuaries Act. [Not necessary, as Wyoming is inland.]</p>

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
<p>A map showing the injection well for which a permit is sought and the applicable area of review consistent with § 146.84. Within the area of review, the map must show the number or name, and location of all injection wells, producing wells, abandoned wells, plugged wells or dry holes, deep stratigraphic boreholes, State- or EPA-approved subsurface cleanup sites, surface bodies of water, springs, mines (surface and subsurface), quarries, water wells, other pertinent surface features including structures intended for human occupancy, State, Tribal, and Territory boundaries, and roads. The map should also show faults, if known or suspected. Only information of public record is required to be included on this map;</p>	<p>40 CFR §146.82(a)(2)</p>	<p>Chapter 24 Section 5(b)(vi).</p> <p>A map showing the injection well(s) for which a permit is sought and the applicable area of review. NEED ref to 146.84</p> <p>Within the area of review, the map must show the number, or name and location of all known injection wells, producing wells, abandoned wells, plugged wells or dry holes, deep stratigraphic boreholes, state or EPA approved subsurface cleanup sites, public drinking water supply wellhead or source water protection areas, surface bodies of water, springs, mines (surface and subsurface), quarries, water wells and other pertinent surface features including structures intended for human occupancy and roads.</p> <p>Only information of public record is required to be included on this map.</p>	<p>Similar. However, the state regulation does not include other pertinent surface features including “State, Tribal, and Territory boundaries.” It also does not require maps of faults (the rule does require structural contour maps, geologic cross sections and written descriptions of faults and fractures under Section 5(b)(vii)).</p>
<p>Information on the geologic structure and hydrogeologic properties of the proposed storage site and overlying formations, including:</p>	<p>40 CFR §146.82(a)(3)</p>	<p>Chapter 24 Section 5(b)(viii).</p> <p>A description of the general geology of the area to be affected by the injection of carbon dioxide including geochemistry, structure and faulting, fracturing and seals, and stratigraphy and lithology including petrophysical attributes. The description shall also include sufficient information on the geologic structure and reservoir properties of the proposed storage site and overlying formations, including:</p>	<p>Similar.</p>
<p>Maps and cross sections of the area of review;</p>	<p>40 CFR §146.82(a)(3)(i)</p>	<p>Chapter 24 Section 5(b)(vii).</p> <p>A map delineating the area of review based upon modeling, using all available data including data available from any logging and testing of wells within and adjacent to the area of review;</p> <p>Chapter 24 Section 5(b)(viii)(A).</p> <p>Isopach maps of the proposed injection and confining zone(s), a structural contour map aligned with the top of the proposed injection zone, and at least two geologic cross sections of the area of review reasonably perpendicular to each other and showing the geologic formations from the surface to total depth;</p>	<p>Similar.</p>

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
The location, orientation, and properties of known or suspected faults and fractures that may transect the confining zone(s) in the area of review and a determination that they would not interfere with containment;	40 CFR §146.82(a)(3)(ii)	Chapter 24 Section 5(b)(viii)(B). Location, orientation, and properties of known or suspected faults and fractures that may transect the confining zone(s) in the area of review and a determination that they would not interfere with containment.	Same.
Data on the depth, areal extent, thickness, mineralogy, porosity, permeability, and capillary pressure of the injection and confining zone(s); including geology/facies changes based on field data which may include geologic cores, outcrop data, seismic surveys, well logs, and names and lithologic descriptions;	40 CFR §146.82(a)(3)(iii)	Chapter 24 Section 5(b)(viii)(D). Data sufficient to demonstrate the effectiveness of the injection and confining zone(s), including data on the depth, areal extent, thickness, mineralogy, porosity, vertical permeability and reservoir pressure of the injection and confining zone(s) within the area of review, and geologic changes based on field data which may include geologic cores, outcrop data, seismic surveys, well logs, capillary pressure tests and names and lithologic descriptions.	Similar. Note that the state regulation refers to reservoir pressure and the federal regulation refers specifically to capillary pressure (these are slightly different).
Geomechanical information on fractures, stress, ductility, rock strength, and in situ fluid pressures within the confining zone(s);	40 CFR §146.82(a)(3)(iv)	Chapter 24 Section 5(b)(viii)(E). Geomechanical information on fractures, stress, ductility, rock strength, and in situ fluid pressures within the confining zone.	Same.
Information on the seismic history including the presence and depth of seismic sources and a determination that the seismicity would not interfere with containment; and	40 CFR §146.82(a)(3)(v)	Chapter 24 Section 5(b)(viii)(C). Information on seismic history that have affected the proposed area of review including knowledge of previous seismic events and history of these events, the presence and depth of seismic sources, and a determination that the seismicity would not compromise containment.	Similar.
Geologic and topographic maps and cross sections illustrating regional geology, hydrogeology, and the geologic structure of the local area.	40 CFR §146.82(a)(3)(vi)	Chapter 24 Section 5(b)(viii)(F). Geologic and topographic maps and cross sections illustrating regional geology, hydrogeology, and the geologic structure of the local area.	Same.
A tabulation of all wells within the area of review which penetrate the injection or confining zone(s). Such data must include a description of each well's type, construction, date drilled, location, depth, record of plugging and/or completion, and any additional information the Director may require;	40 CFR §146.82(a)(4)	Chapter 24 Section 5(b)(ix) & (ix)(A). A compilation of all wells and other drill holes within, and adjacent (within 1 mile) to the area of review. Such data must include a description of each well and drill hole type, construction, date drilled, location, depth, record of plugging and/or completion, and any additional information the administrator may require. Applicants shall also identify the location of all known wells within, and adjacent (within 1 mile) to the area of review which penetrate the confining or injection zone.	The state regulation limits this tabulation to a one mile radius around the well; the federal regulation requires all wells in the AoR be included in the tabulation. Depending on the size of the AoR, the state regulation may be less stringent. State is more stringent, requires within 1 mile of AOR

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Maps and stratigraphic cross sections indicating the general vertical and lateral limits of all USDWs, water wells and springs within the area of review, their positions relative to the injection zone(s), and the direction of water movement, where known;	40 CFR §146.82(a)(5)	Chapter 24 Section 5(b)(x). Maps and stratigraphic cross sections indicating the general vertical and lateral limits of all USDWs, the location of water wells and springs within the area of review, their positions relative to the injection zone(s), and the direction of water movement, where known.	Same.
Baseline geochemical data on subsurface formations, including all USDWs in the area of review;	40 CFR §146.82(a)(6)	Chapter 24 Section 5(b)(xii). Baseline geochemical data on subsurface formations, including all USDWs in the area of review.	Same.
Proposed operating data for the proposed geologic sequestration site:	40 CFR §146.82(a)(7)	Chapter 24 Section 5(b)(xiii). Proposed operating data:	Similar.
Average and maximum daily rate and volume and/or mass and total anticipated volume and/or mass of the carbon dioxide stream;	40 CFR §146.82(a)(7)(i)	Chapter 24 Section 5(b)(xiii)(A). Average and maximum daily rate and volume of the carbon dioxide stream;	Similar. The state regulation does not require the average and maximum total anticipated volume and/or mass of the carbon dioxide stream. Need and/or mass
Average and maximum injection pressure;	40 CFR §146.82(a)(7)(ii)	Chapter 24 Section 5(b)(xiii)(B). Average and maximum surface injection pressure;	Similar.
The source(s) of the carbon dioxide stream; and	40 CFR §146.82(a)(7)(iii)	Chapter 24 Section 5(b)(xiii)(C). The source of the carbon dioxide stream; and	Similar.
An analysis of the chemical and physical characteristics of the carbon dioxide stream.	40 CFR §146.82(a)(7)(iv)	Chapter 24 Section 5(b)(xiii)(D). An analysis of the chemical and physical characteristics of the carbon dioxide stream and any other substance(s) proposed for inclusion in the injectate stream; and	Similar. The second part ("any other substances") may not be necessary since the definition for carbon dioxide stream already includes substances added to the stream to improve the injection process.
Proposed pre-operational formation testing program to obtain an analysis of the chemical and physical characteristics of the injection zone(s) and confining zone(s) and that meets the requirements at §146.87;	40 CFR §146.82(a)(8)	Chapter 24 Section 5(b)(xvi). Proposed formation testing program to obtain an analysis of the chemical and physical characteristics of the injection zone and confining zone. Need to add 146.87	Similar. The state regulation does not specifically tie the formation testing program to the requirements of Section 10.
Proposed stimulation program, a description of stimulation fluids to be used and a determination that stimulation will not interfere with containment;	40 CFR §146.82(a)(9)	Chapter 24 Section 5(b)(xvii). Proposed stimulation program and a determination that stimulation will not compromise containment.	Similar. The state regulation does not require a description of the stimulation fluids to be used. Need description of the stimulation fluids
Proposed procedure to outline steps necessary to conduct injection operation;	40 CFR §146.82(a)(10)	Chapter 24 Section 5(b)(xix). Proposed procedure to outline steps necessary to conduct injection operation.	Same.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Schematics or other appropriate drawings of the surface and subsurface construction details of the well;	40 CFR §146.82(a)(11)	Chapter 24 Section 5(b)(xx). A wellbore schematic of the subsurface construction details and surface wellhead construction of the injection and monitoring wells.	Similar.
Injection well construction procedures that meet the requirements of §146.86;	40 CFR §146.82(a)(12)	Chapter 24 Section 5(b)(xxi). Injection well design and construction procedures that meet the requirements of Section 9.	Similar. Section 9 needs to meet 146.86
Proposed area of review and corrective action plan that meets the requirements under §146.84;	40 CFR §146.82(a)(13)	Chapter 24 Section 5(b)(xxii). Proposed area of review and corrective action plan that meets the requirements under Section 8.	Same. Section 8 needs to meet 146.84
A demonstration, satisfactory to the Director, that the applicant has met the financial responsibility requirements under §146.85;	40 CFR §146.82(a)(14)	Chapter 24 Section 5(b)(xxvi). A demonstration, satisfactory to the administrator, that the applicant has met the financial responsibility requirements under Section 18.	Same. §146
Proposed testing and monitoring plan required by §146.90;	40 CFR §146.82(a)(15)	Chapter 24 Section 5(b)(xxvii). Proposed testing and monitoring plan required by Section 13.	Same. §146
Proposed injection well plugging plan required by §146.92(b);	40 CFR §146.82(a)(16)	Chapter 24 Section 5(b)(xxviii). Proposed injection and monitoring well(s) plugging plan required by Section 15(b).	Similar. §146
Proposed post-injection site care and site closure plan required by §146.93(a);	40 CFR §146.82(a)(17)	Chapter 24 Section 5(b)(xxix). Proposed post-injection site care plan required by Section 16(a).	Similar. Note that although Section 5(b)(xxix) refers to just post-injection site care and not site closure, the plan described in Section 16(a) refers to both. §146
At the Director's discretion, a demonstration of an alternative post-injection site care timeframe required by §146.93(c);	40 CFR §146.82(a)(18)	NONE	The state regulation does not specify a post-injection site care timeframe or alternative timeframe. NEED, DEQ uses a performance based approach.
Proposed emergency and remedial response plan required by §146.94(a);	40 CFR §146.82(a)(19)	Chapter 24 Section 5(b)(xxx). Proposed emergency and remedial response plan required by Section 17.	Same.
A list of contacts, submitted to the Director, for those States, Tribes, and Territories identified to be within the area of review of the Class VI project based on information provided in paragraph (a)(2) of this section; and	40 CFR §146.82(a)(20)	NONE	NEED

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Any other information requested by the Director.	40 CFR §146.82(a)(21)	Chapter 24 Section 5(b)(xxxiv). Any other information requested by the administrator.	Same.
The Director shall notify, in writing, any States, Tribes, or Territories within the area of review of the Class VI project based on information provided in paragraphs (a)(2) and (a)(20) of this section of the permit application and pursuant to the requirements at §145.23(f)(13) of this chapter.	40 CFR §146.82(b)	NONE	The state regulation does require proof of notice to surface owners, mineral claimants, mineral owners, lessees and other owners of record of subsurface interests under Section 5(b)(vi)(xxxiii) but does not require written notice to any States, Tribes, or Territories within the area of review. Director/State required to perform this, not operator
Prior to granting approval for the operation of a Class VI well, the Director shall consider the following information:	40 CFR §146.82(c)	Chapter 24 Section 4(a)(iv). A separate permit to construct is not required under Chapter 3, Water Quality Rules and Regulations for any Class VI facility.	The state regulation does not explicitly separate the permit application into two phases (pre-construction and pre-operation) as the federal rule does. Therefore, the state regulation does not specifically require the director to address some of the items in 146.82(c). Section 5(b)(xxiv) may address this, however. Director should be required to consider the info. Sect 5 speaks to the operator's responsibilities
The final area of review based on modeling, using data obtained during logging and testing of the well and the formation as required by paragraphs (c)(2), (3), (4), (6), (7), and (10) of this section;	40 CFR §146.82(c)(1)	NONE.	NEED
Any relevant updates, based on data obtained during logging and testing of the well and the formation as required by paragraphs (c)(3), (4), (6), (7), and (10) of this section, to the information on the geologic structure and hydrogeologic properties of the proposed storage site and overlying formations, submitted to satisfy the requirements of paragraph (a)(3) of this section;	40 CFR §146.82(c)(2)	NONE.	NEED
Information on the compatibility of the carbon dioxide stream with fluids in the injection zone(s) and minerals in both the injection and the confining zone(s), based on the results of the formation testing program, and with the materials used to construct the well;	40 CFR §146.82(c)(3)	Chapter 24 Section 5(b)(xiv). The compatibility of the carbon dioxide stream with fluids in the injection zone and minerals in both the injection and the confining zone(s), based on the results of the formation testing program, and with the materials used to construct the well.	Same.
The results of the formation testing program required at paragraph (a)(8) of this section;	40 CFR §146.82(c)(4)	Chapter 24 Section 5(b)(xviii). The results of the formation testing program as required in paragraph (xvi) of this section.	Same.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Final injection well construction procedures that meet the requirements of §146.86;	40 CFR §146.82(c)(5)	NONE.	NEED
The status of corrective action on wells in the area of review;	40 CFR §146.82(c)(6)	Chapter 24 Section 5(b)(xxiii). The status of corrective action on wells in the area of review.	Same.
All available logging and testing program data on the well required by §146.87;	40 CFR §146.82(c)(7)	Chapter 24 Section 5(b)(xxiv). All available logging and testing program data on the well(s) required by Section 10.	Same. Section 10 needs to meet 146.87
A demonstration of mechanical integrity pursuant to §146.89;	40 CFR §146.82(c)(8)	Chapter 24 Section 5(b)(xxv). A demonstration of mechanical integrity pursuant to Section 12.	Same. ***
Any updates to the proposed area of review and corrective action plan, testing and monitoring plan, injection well plugging plan, post-injection site care and site closure plan, or the emergency and remedial response plan submitted under paragraph (a) of this section, which are necessary to address new information collected during logging and testing of the well and the formation as required by all paragraphs of this section, and any updates to the alternative post-injection site care timeframe demonstration submitted under paragraph (a) of this section, which are necessary to address new information collected during the logging and testing of the well and the formation as required by all paragraphs of this section; and	40 CFR §146.82(c)(9)	NONE.	NEED
Any other information requested by the Director.	40 CFR §146.82(c)(10)	Chapter 24 Section 5(b)(xxxiv). Any other information requested by the administrator.	Same.
Owners or operators seeking a waiver of the requirement to inject below the lowermost USDW must also refer to §146.95 and submit a supplemental report, as required at §146.95(a). The supplemental report is not part of the permit application.	40 CFR §146.82(d)	NONE	The state regulation does not mention injection depth waivers; however, allowing for injection depth waivers is optional (see 146.95 in this crosswalk for more).

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
40 CFR §146.83 Minimum criteria for siting.			
Owners or operators of Class VI wells must demonstrate to the satisfaction of the Director that the wells will be sited in areas with a suitable geologic system. The owners or operators must demonstrate that the geologic system comprises:	40 CFR §146.83(a)	Chapter 24 Section 7(a). Owners or operators of Class VI wells must demonstrate to the satisfaction of the administrator that the wells will be sited in areas with a suitable geologic system. The geologic system must be comprised of:	Similar.
An injection zone(s) of sufficient areal extent, thickness, porosity, and permeability to receive the total anticipated volume of the carbon dioxide stream;	40 CFR §146.83(a)(1)	Chapter 24 Section 7(a)(i). An injection zone of sufficient areal extent, thickness, porosity, and permeability to receive the total anticipated volume of the carbon dioxide stream; and	Same.
Confining zone(s) free of transmissive faults or fractures and of sufficient areal extent and integrity to contain the injected carbon dioxide stream and displaced formation fluids and allow injection at proposed maximum pressures and volumes without initiating or propagating fractures in the confining zone(s).	40 CFR §146.83(a)(2)	Chapter 24 Section 7(a)(ii). A confining zone(s) that is free of transmissive faults or fractures and of sufficient areal extent and integrity to contain the injected carbon dioxide stream and displaced formation fluids and allow injection at proposed maximum pressures and volumes without initiating or propagating fractures in the confining zone(s) or causing non-transmissive faults to become transmissive.	Similar.
The Director may require owners or operators of Class VI wells to identify and characterize additional zones that will impede vertical fluid movement, are free of faults and fractures that may interfere with containment, allow for pressure dissipation, and provide additional opportunities for monitoring, mitigation, and remediation.	40 CFR §146.83(b)	Chapter 24 Section 7(b). Owners or operators of Class VI wells must identify and characterize additional zones, if they exist, that will impede vertical fluid movement, allow for pressure dissipation, and provide additional opportunities for monitoring, mitigation and remediation. Vertical faults and fractures that transect these zones must be identified.	The state regulation differs in the language regarding faults and fractures in additional zones. The state regulation requires the identification of vertical faults and fractures that transect these zones. The federal rule requires these additional zones to be “free of faults and fractures that may interfere with containment.” Additionally, the state regulation is more stringent in that it requires owners or operators to identify and characterize additional zones, if they exist. The federal rule provides Director discretion to require owners or operators to identify and characterize additional zones.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
40 CFR §146.84 Area of review and corrective action.			
The area of review is the region surrounding the geologic sequestration project where USDWs may be endangered by the injection activity. The area of review is delineated using computational modeling that accounts for the physical and chemical properties of all phases of the injected carbon dioxide stream and is based on available site characterization, monitoring, and operational data.	40 CFR §146.84(a)	<p>Chapter 24 Section 2(c).</p> <p>“Area of review” means the subsurface three-dimensional extent of the carbon dioxide plume, associated pressure front, and displaced fluids, as well as the overlying formations and surface area above that delineated region.</p> <p>Chapter 24 Section 8(a).</p> <p>The area of review is based on computational modeling that accounts for the physical and chemical properties of all phases of the injected carbon dioxide stream.</p>	<p>The state definition of AoR does not specifically say that the AoR is delineated using computational modeling; however Section 8 does require this modeling (see below for discussion).</p> <p>The state regulation does not explicitly include the general meaning of the area of review, i.e., that the area of review means the region surrounding the geologic sequestration project where USDWs may be endangered by the injection activity. This general meaning may not be needed in Section 8.</p> <p>Add: is based on available site characterization, monitoring, and operational data.</p>
The owner or operator of a Class VI well must prepare, maintain, and comply with a plan to delineate the area of review for a proposed geologic sequestration project, periodically reevaluate the delineation, and perform corrective action that meets the requirements of this section and is acceptable to the Director. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit. As a part of the permit application for approval by the Director, the owner or operator must submit an area of review and corrective action plan that includes the following information:	40 CFR §146.84(b)	<p>Chapter 24 Section 8(b).</p> <p>The owner or operator of a Class VI well must prepare, maintain, and comply with a plan to delineate the area of review for a proposed geologic sequestration project, re-evaluate the delineation, and perform corrective action that meets the requirements of this section and is acceptable to the Director. As a part of the permit application for approval by the administrator, the owner or operator must submit an area of review and corrective action plan that includes the following information:</p>	Similar. The state regulation does not include the provision “the requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit.”
The method for delineating the area of review that meets the requirements of paragraph (c) of this section, including the model to be used, assumptions that will be made, and the site characterization data on which the model will be based;	40 CFR §146.84(b)(1)	<p>Chapter 24 Section 8(b)(i).</p> <p>The method for delineating the area of review that meets the requirements of paragraph (c) of this section, including the name, version and availability of the model to be used, assumptions that will be made, and the site characterization data on which the model will be based;</p>	Similar.
A description of:	40 CFR §146.84(b)(2)	<p>Chapter 24 Section 8(b)(ii).</p> <p>A description of:</p>	Same.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
The minimum fixed frequency, not to exceed five years, at which the owner or operator proposes to reevaluate the area of review;	40 CFR §146.84(b)(2)(i)	Chapter 24 Section 8(a)(i). The owner or operator will re-evaluate the area of review at least every two (2) years during the operational life of the facility, and then no less frequently than every five (5) years through the post-injection site care period until the geologic sequestration project is closed in accordance with department rules and regulations. Chapter 24 Section 8(e) to be consist with 8(a)(i) "no less" than 5 years vs. just 5 years.	Similar. The state regulation is more stringent than the federal rule regarding the reevaluation frequency of the area of review and requires reevaluation of the AoR throughout post-injection site care.
The monitoring and operational conditions that would warrant a reevaluation of the area of review prior to the next scheduled reevaluation as determined by the minimum fixed frequency established in paragraph (b)(2)(i) of this section.	40 CFR §146.84(b)(2)(ii)	Chapter 24 Section 8(b)(ii)(A). The monitoring and operational conditions that would warrant a re-evaluation of the area of review prior to the next scheduled re-evaluation as determined by the minimum fixed frequency established in paragraph (a)(i) of this section.	Same.
How monitoring and operational data (e.g., injection rate and pressure) will be used to inform an area of review reevaluation; and	40 CFR §146.84(b)(2)(iii)	Chapter 24 Section 8(b)(ii)(B). How monitoring and operational data (e.g., injection rate and pressure) will be used to evaluate the area of review; and	Similar.
How corrective action will be conducted to meet the requirements of paragraph (d) of this section, including what corrective action will be performed prior to injection and what, if any, portions of the area of review will have corrective action addressed on a phased basis and how the phasing will be determined; how corrective action will be adjusted if there are changes in the area of review; and how site access will be guaranteed for future corrective action.	40 CFR §146.84(b)(2)(iv)	Chapter 24 Section 8(b)(ii)(C). How corrective action will be conducted to meet the requirements of paragraph (d) of this section, including: -What corrective action will be performed prior to injection; -What, if any, portions of the area of review will have corrective action addressed on a phased basis, and how the phasing will be determined; -How corrective action will be adjusted if there are changes in the area of review; and -How site access will be ensured for future corrective action.	Same.
Owners or operators of Class VI wells must perform the following actions to delineate the area of review and identify all wells that require corrective action:	40 CFR §146.84(c)	Chapter 24 Section 8(c). Owners or operators of Class VI wells must perform the following actions to delineate the area of review, identify all wells that require corrective action, and perform corrective action on those wells:	Similar.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Predict, using existing site characterization, monitoring and operational data, and computational modeling, the projected lateral and vertical migration of the carbon dioxide plume and formation fluids in the subsurface from the commencement of injection activities until the plume movement ceases, until pressure differentials sufficient to cause the movement of injected fluids or formation fluids into a USDW are no longer present, or until the end of a fixed time period as determined by the Director. The model must:	40 CFR §146.84(c)(1)	Chapter 24 Section 8(c)(i). Predict, using computational modeling: -The projected lateral and vertical migration of the carbon dioxide plume and formation fluids in the subsurface from the commencement of injection activities until the plume movement ceases; -The pressure differentials, and demonstrate that pressure differentials sufficient to cause the movement of injected fluids or formation fluids into a USDW or to otherwise threaten human health, safety, or the environment will not be present (or for a fixed time period as determined by the administrator); -The potential need for brine removal, and; -The long-term effects of pressure buildup if brine is not removed.	Similar. The state regulation does not explicitly require the modeling inputs to include monitoring data; however Section 8(c)(ii)(A) may address the types of monitoring data envisioned in the federal rule.
Be based on detailed geologic data collected to characterize the injection zone(s), confining zone(s) and any additional zones; and anticipated operating data, including injection pressures, rates, and total volumes over the proposed life of the geologic sequestration project;	40 CFR §146.84(c)(1)(i)	Chapter 24 Section 8(c)(ii)(A). The modeling must be based on: -Detailed geologic data available or collected to characterize the injection zone, confining zone and any additional zones; and -Anticipated operating data, including injection pressures, rates and total volumes over the proposed operational life of the facility.	Similar.
Take into account any geologic heterogeneities, other discontinuities, data quality, and their possible impact on model predictions; and	40 CFR §146.84(c)(1)(ii)	Chapter 24 Section 8(c)(ii)(B). Take into account any relevant geologic heterogeneities, data quality, and their possible impact on model predictions; and	Similar. The state regulation does not require the owner or operator to take into account “other discontinuities” in the modeling.
Consider potential migration through faults, fractures, and artificial penetrations.	40 CFR §146.84(c)(1)(iii)	Chapter 24 Section 8(c)(ii)(C). Consider potential migration through faults, fractures, and artificial penetrations.	Same.
Using methods approved by the Director, identify all penetrations, including active and abandoned wells and underground mines, in the area of review that may penetrate the confining zone(s). Provide a description of each well’s type, construction, date drilled, location, depth, record of plugging and/or completion, and any additional information the Director may require; and	40 CFR §146.84(c)(2)	Chapter 24 Section 8(c)(iii). Using methods approved by the administrator, identify all penetrations, including active and abandoned wells and underground mines, in the area of review that may penetrate the confining zone. Provide a description of each well’s type, construction, date drilled, location, depth, record of plugging and/or completion, and any additional information the administrator may require; and	Same.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Determine which abandoned wells in the area of review have been plugged in a manner that prevents the movement of carbon dioxide or other fluids that may endanger USDWs, including use of materials compatible with the carbon dioxide stream.	40 CFR §146.84(c)(3)	Chapter 24 Section 8(c)(iv). Determine which abandoned wells in the area of review have been plugged in a manner that prevents the movement of: -Carbon dioxide that may endanger USDWs or otherwise threaten human health, safety, or the environment, or; -Displaced formation fluids that may endanger USDWs or otherwise threaten human health, safety, or the environment.	Similar. The state regulation does not explicitly require evaluation of whether the materials used are compatible with the carbon dioxide stream.
Owners or operators of Class VI wells must perform corrective action on all wells in the area of review that are determined to need corrective action, using methods designed to prevent the movement of fluid into or between USDWs, including use of materials compatible with the carbon dioxide stream, where appropriate.	40 CFR §146.84(d)	Chapter 24 Section 8(d). Owners or operators of Class VI wells must perform corrective action on all wells in the area of review that are determined to need corrective action using methods necessary to prevent the movement of fluid into or between USDWs including use of corrosion resistant materials, where appropriate.	Similar. The state regulation uses “corrosion resistant materials” rather than “materials compatible with the carbon dioxide stream.”
At the minimum fixed frequency, not to exceed five years, as specified in the area of review and corrective action plan, or when monitoring and operational conditions warrant, owners or operators must:	40 CFR §146.84(e)	Chapter 24 Section 8(e). At a fixed frequency, not to exceed two (2) years during the operational life of the facility, or five (5) years during the post-injection site care period (until the geologic sequestration project is closed) as specified in the area of review and corrective action plan, or when monitoring and operational conditions warrant, owners or operators must:	Similar. The state regulation is more stringent than the federal rule regarding the AoR reevaluation frequency and requires reevaluation of the AoR throughout post-injection site care.
Reevaluate the area of review in the same manner specified in paragraph (c)(1) of this section;	40 CFR §146.84(e)(1)	Chapter 24 Section 8(e)(i). Re-evaluate the area of review in the same manner specified in paragraph (c)(i) of this section;	Same.
Identify all wells in the reevaluated area of review that require corrective action in the same manner specified in paragraph (c) of this section;	40 CFR §146.84(e)(2)	Chapter 24 Section 8(e)(ii). Identify all wells in the re-evaluated area of review that require corrective action in the same manner specified in paragraph (c)(iv) of this section;	Same.
Perform corrective action on wells requiring corrective action in the reevaluated area of review in the same manner specified in paragraph (d) of this section; and	40 CFR §146.84(e)(3)	Chapter 24 Section 8(e)(iii). Perform corrective action on wells requiring corrective action in the reevaluated area of review in the same manner specified in paragraph (d) of this section; and	Same.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Submit an amended area of review and corrective action plan or demonstrate to the Director through monitoring data and modeling results that no amendment to the area of review and corrective action plan is needed. Any amendments to the area of review and corrective action plan must be approved by the Director, must be incorporated into the permit, and are subject to the permit modification requirements at §§144.39 or 144.41 of this chapter, as appropriate.	40 CFR §146.84(e)(4)	Chapter 24 Section 8(e)(iv). Submit an amended area of review and corrective action plan or demonstrate to the administrator through monitoring data and modeling results that no change to the area of review and corrective action plan is needed.	Similar. The state regulation does not explicitly require amendments to the area of review and corrective action plan to be incorporated into the permit.
The emergency and remedial response plan (as required by §146.94) and the demonstration of financial responsibility (as described by §146.85) must account for the area of review delineated as specified in paragraph (c)(1) of this section or the most recently evaluated area of review delineated under paragraph (e) of this section, regardless of whether or not corrective action in the area of review is phased.	40 CFR §146.84(f)	Chapter 24 Section 8(f). The emergency and remedial response plan (as required by Section 17) and a demonstration of financial responsibility (as described by Section 18) must account for the entire area of review [as modified], regardless of whether or not corrective action in the area of review is phased.	Similar.
All modeling inputs and data used to support area of review reevaluations under paragraph (e) of this section shall be retained for 10 years.	40 CFR §146.84(g)	NONE	NEED
40 CFR §146.85 Financial responsibility.			
The owner or operator must demonstrate and maintain financial responsibility as determined by the Director that meets the following conditions:	40 CFR §146.85(a)	Chapter 24 Section 18(a). The owner or operator must demonstrate and maintain financial responsibility and resources for corrective action (that meets the requirements of Section 8), injection well plugging (that meets the requirements of Section 15), post-injection site care and site closure (that meets the requirements of Section 16), and emergency and remedial response (that meets the requirements of Section 17) in a manner prescribed by the Director until the administrator receives the well plugging report identified in Section 15(d), or the post-injection site care and site closure plan requirements are met, as appropriate; or the Director authorizes site closure.	The demonstration of financial responsibility in the state regulation is less specific than in the federal rule.
The financial responsibility instrument(s) used must be from the following list of qualifying instruments:	40 CFR §146.85(a)(1)	NONE	The state regulation does not specify or limit the types of qualifying financial responsibility instruments.
Trust Funds	40 CFR §146.85(a)(1)(i)	NONE	
Surety Bonds	40 CFR §146.85(a)(1)(ii)	NONE	
Letter of Credit	40 CFR §146.85(a)(1)(iii)	NONE	
Insurance	40 CFR §146.85(a)(1)(iv)	NONE	

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Self Insurance (i.e., Financial Test and Corporate Guarantee)	40 CFR §146.85(a)(1)(v)	NONE	
Escrow Account	40 CFR §146.85(a)(1)(vi)	NONE	
Any other instrument(s) satisfactory to the Director	40 CFR §146.85(a)(1)(vii)	NONE	
The qualifying instrument(s) must be sufficient to cover the cost of:	40 CFR §146.85(a)(2)	Chapter 24 Section 18(a). The owner or operator must demonstrate and maintain financial responsibility and resources for corrective action (that meets the requirements of Section 8), injection well plugging (that meets the requirements of Section 15), post-injection site care and site closure (that meets the requirements of Section 16), and emergency and remedial response (that meets the requirements of Section 17) in a manner prescribed by the Director until the administrator receives the well plugging report identified in Section 15(d), or the post-injection site care and site closure plan requirements are met, as appropriate; or the Director authorizes site closure.	Similar
Corrective action (that meets the requirements of §146.84);	40 CFR §146.85(a)(2)(i)	Chapter 24 Section 18(a).	Similar
Injection well plugging (that meets the requirements of §146.92);	40 CFR §146.85(a)(2)(ii)	Chapter 24 Section 18(a).	Similar
Post injection site care and site closure (that meets the requirements of §146.93); and	40 CFR §146.85(a)(2)(iii)	Chapter 24 Section 18(a).	Similar
Emergency and remedial response (that meets the requirements of §146.94).	40 CFR §146.85(a)(2)(iv)	Chapter 24 Section 18(a).	Similar
The financial responsibility instrument(s) must be sufficient to address endangerment of underground sources of drinking water.	40 CFR §146.85(a)(3)	NONE	
The qualifying financial responsibility instrument(s) must comprise protective conditions of coverage.	40 CFR §146.85(a)(4)	NONE	
Protective conditions of coverage must include at a minimum cancellation, renewal, and continuation provisions, specifications on when the provider becomes liable following a notice of cancellation if there is a failure to renew with a new qualifying financial instrument, and requirements for the provider to meet a minimum rating, minimum capitalization, and ability to pass the bond rating when applicable.	40 CFR §146.85(a)(4)(i)	NONE	

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Cancellation – for purposes of this part, an owner or operator must provide that their financial mechanism may not cancel, terminate or fail to renew except for failure to pay such financial instrument. If there is a failure to pay the financial instrument, the financial institution may elect to cancel, terminate, or fail to renew the instrument by sending notice by certified mail to the owner or operator and the Director. The cancellation must not be final for 120 days after receipt of cancellation notice. The owner or operator must provide an alternate financial responsibility demonstration within 60 days of notice of cancellation, and if an alternate financial responsibility demonstration is not acceptable (or possible), any funds from the instrument being cancelled must be released within 60 days of notification by the Director.	40 CFR §146.85(a)(4)(i)(A)	NONE	
Renewal – for purposes of this part, owners or operators must renew all financial instruments, if an instrument expires, for the entire term of the geologic sequestration project. The instrument may be automatically renewed as long as the owner or operator has the option of renewal at the face amount of the expiring instrument. The automatic renewal of the instrument must, at a minimum, provide the holder with the option of renewal at the face amount of the expiring financial instrument.	40 CFR §146.85(a)(4)(i)(B)	NONE	
Cancellation, termination, or failure to renew may not occur and the financial instrument will remain in full force and effect in the event that on or before the date of expiration: the Director deems the facility abandoned; or the permit is terminated or revoked or a new permit is denied; or closure is ordered by the Director or a U.S. district court or other court of competent jurisdiction; or the owner or operator is named as debtor in a voluntary or involuntary proceeding under Title 11 (Bankruptcy), U.S. Code; or the amount due is paid.	40 CFR §146.85(a)(4)(i)(C)	NONE	
The qualifying financial responsibility instrument(s) must be approved by the Director.	40 CFR §146.85(a)(5)	NONE	
The Director shall consider and approve the financial responsibility demonstration for all the phases of the geologic sequestration project prior to issue a Class VI permit (§146.82).	40 CFR §146.85(a)(5)(i)	NONE	

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
The owner or operator must provide any updated information related to their financial responsibility instrument(s) on an annual basis and if there are any changes, the Director must evaluate, within a reasonable time, the financial responsibility demonstration to confirm that the instrument(s) used remain adequate for use. The owner or operator must maintain financial responsibility requirements regardless of the status of the Director's review of the financial responsibility demonstration.	40 CFR §146.85(a)(5)(ii)	Chapter 24 Section 18(b). The owner or operator must provide to the Administrator annual written updates of adjustments to the cost estimate to account for any amendments to the area of review and corrective action plan (Section 8), the injection well plugging plan (Section 15), and the post-injection site care and site closure plan (Section 16).	The state regulation requires annual updates to financial responsibility, but does not specifically mention any review of the financial responsibility instrument(s). The state regulation also does not go into detail about the administrator's review, except that the operator must provide an adjustment of the cost estimate to the administrator if the administrator has reason to believe that the most recent demonstration is no longer adequate (see Chapter 24 Section 18(d), below).
The Director may disapprove the use of a financial instrument if he determines that it is not sufficient to meet the requirements of this section.	40 CFR §146.85(a)(5)(iii)	NONE	
The owner or operator may demonstrate financial responsibility by using one or multiple qualifying financial instruments for specific phases of the geologic sequestration project.	40 CFR §146.85(a)(6)	NONE	
In the event that the owner or operator combines more than one instrument for a specific geologic sequestration phase (e.g., well plugging), such combination must be limited to instruments that are not based on financial strength or performance (i.e., self insurance or performance bond), for example trust funds, surety bonds guaranteeing payment into a trust fund, letters of credit, escrow account, and insurance. In this case, it is the combination of mechanisms, rather than the single mechanism, which must provide financial responsibility for an amount at least equal to the current cost estimate.	40 CFR §146.85(a)(6)(i)	NONE	
When using a third-party instrument to demonstrate financial responsibility, the owner or operator must provide a proof that the third-party providers either have passed financial strength requirements based on credit ratings; or has met a minimum rating, minimum capitalization, and ability to pass the bond rating when applicable.	40 CFR §146.85(a)(6)(ii)	NONE	
An owner or operator using certain types of third party instruments must establish a standby trust to enable EPA to be party to the financial responsibility agreement without EPA being the beneficiary of any funds. The standby trust fund must be used along with other financial responsibility instruments (e.g., surety bonds, letters of credit, or escrow accounts) to provide a location to place funds if needed.	40 CFR §146.85(a)(6)(iii)	NONE	

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
An owner or operator may deposit money to an escrow account to cover financial responsibility requirements; this account must segregate funds sufficient to cover estimated costs for Class VI (geologic sequestration) financial responsibility from other accounts and uses.	40 CFR §146.85(a)(6)(iv)	NONE	
An owner or operator or its guarantor may use self insurance to demonstrate financial responsibility for geologic sequestration projects. In order to satisfy this requirement the owner or operator must meet a Tangible Net Worth of an amount approved by the Director, have a Net working capital and tangible net worth each at least six times the sum of the current well plugging, post injection site care and site closure cost, have assets located in the United States amounting to at least 90 percent of total assets or at least six times the sum of the current well plugging, post injection site care and site closure cost, and must submit a report of its bond rating and financial information annually. In addition the owner or operator must either: have a bond rating test of AAA, AA, A, or BBB as issued by Standard & Poor's or Aaa, Aa, A, or Baa as issued by Moody's; or meet all of the following five financial ratio thresholds: a ratio of total liabilities to net worth less than 2.0; a ratio of current assets to current liabilities greater than 1.5; a ratio of the sum of net income plus depreciation, depletion, and amortization to total liabilities greater than 0.1; a ratio of current assets minus current liabilities to total assets greater than -0.1; and a net profit (revenues minus expenses) greater than 0.	40 CFR §146.85(a)(6)(v)	NONE	
An owner or operator who is not able to meet corporate financial test criteria may arrange a corporate guarantee by demonstrating that its corporate parent meets the financial test requirements on its behalf. The parent's demonstration that it meets the financial test requirement is insufficient if it has not also guaranteed to fulfill the obligations for the owner or operator.	40 CFR §146.85(a)(6)(vi)	NONE	
An owner or operator may obtain an insurance policy to cover the estimated costs of geologic sequestration activities requiring financial responsibility. This insurance policy must be obtained from a third party provider.	40 CFR §146.85(a)(6)(vii)	NONE	
The requirement to maintain adequate financial responsibility and resources is directly enforceable regardless of whether the requirement is a condition of the permit.	40 CFR §146.85(b)	NONE	

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
The owner or operator must maintain financial responsibility and resources until:	40 CFR §146.85(b)(1)	Chapter 24 Section 18(a). The owner or operator must demonstrate and maintain financial responsibility and resources for corrective action (that meets the requirements of Section 8), injection well plugging (that meets the requirements of Section 15), post-injection site care and site closure (that meets the requirements of Section 16), and emergency and remedial response (that meets the requirements of Section 17) in a manner prescribed by the Director until: (i) The administrator receives the well plugging report identified in Section 15(d), or the post-injection site care and site closure plan requirements are met, as appropriate; or (ii) The Director authorizes site closure.	The state regulation is less stringent, as it requires the operator to maintain financial responsibility until the well plugging report is received or post injection site care requirements are met, OR the director approves site closure. The federal regulation requires financial responsibility until the director has approved BOTH activities. It is not clear that these requirements are equivalent. In addition, while the intent of the state regulation may have been to release the owner or operator from a financial instrument at a certain period of the project (e.g., after injection has ceased), as permitted in 40 CFR 146.85(b)(2), the effect is that the state regulation is less stringent.
The Director receives and approves the completed post-injection site care and site closure plan; and	40 CFR §146.85(b)(1)(i)	Chapter 24 Section 18(a)(i). The administrator receives the well plugging report identified in Section 15(d), or the post-injection site care and site closure plan requirements are met, as appropriate; or	See above.
The Director approves site closure.	40 CFR §146.85(b)(1)(ii)	Chapter 24 Section 18(a)(ii). The Director authorizes site closure.	See above.
The owner or operator may be released from a financial instrument in the following circumstances:	40 CFR §146.85(b)(2)	NONE	
The owner or operator has completed the phase of the geologic sequestration project for which the financial instrument was required and has fulfilled all its financial obligations as determined by the Director, including obtaining financial responsibility for the next phase of the GS project, if required; or	40 CFR §146.85(b)(2)(i)	NONE	
The owner or operator has submitted a replacement financial instrument and received written approval from the Director accepting the new financial instrument and releasing the owner or operator from the previous financial instrument.	40 CFR §146.85(b)(2)(ii)	NONE	

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
The owner or operator must have a detailed written estimate, in current dollars, of the cost of performing corrective action on wells in the area of review, plugging the injection well(s), post-injection site care and site closure, and emergency and remedial response.	40 CFR §146.85(c)	Chapter 24 Section 18(b). The owner or operator must provide to the Administrator annual written updates of adjustments to the cost estimate to account for any amendments to the area of review and corrective action plan (Section 8), the injection well plugging plan (Section 15), and the post-injection site care and site closure plan (Section 16).	Section 18(b) of the state regulation does not specifically require the initial detailed estimate specified in the federal rule. 18(b) also does not require a written estimate of the cost of performing emergency and remedial response.
The cost estimate must be performed for each phase separately and must be based on the costs to the regulatory agency of hiring a third party to perform the required activities. A third party is a party who is not within the corporate structure of the owner or operator.	40 CFR §146.85(c)(1)	NONE	
During the active life of the geologic sequestration project, the owner or operator must adjust the cost estimate for inflation within 60 days prior to the anniversary date of the establishment of the financial instrument(s) used to comply with paragraph (a) of this section and provide this adjustment to the Director. The owner or operator must also provide to the Director written updates of adjustments to the cost estimate within 60 days of any amendments to the area of review and corrective action plan (§146.84), the injection well plugging plan (§146.92), the post-injection site care and site closure plan (§146.93), and the emergency and remedial response plan (§146.94).	40 CFR §146.85(c)(2)	Chapter 24 Section 18(b). The owner or operator must provide to the Administrator annual written updates of adjustments to the cost estimate to account for any amendments to the area of review and corrective action plan (Section 8), the injection well plugging plan (Section 15), and the post-injection site care and site closure plan (Section 16).	Both the state regulation and federal rule require written updates of adjustments to the cost estimate to account for plan amendments. However, the state regulation does not require an update to the emergency and remedial response plan. The state regulation does not include a requirement to update the cost estimate for inflation. Also, the timeline for the updates is not as stringent in the state regulation. The state regulation requires annual updates and the federal rule requires updates within 60 days of any amendments.
The Director must approve any decrease or increase to the initial cost estimate. During the active life of the geologic sequestration project, the owner or operator must revise the cost estimate no later than 60 days after the Director has approved the request to modify the area of review and corrective action plan (§146.84), the injection well plugging plan (§146.92), the post-injection site care and site closure plan (§146.93), and the emergency and response plan (§146.94), if the change in the plan increases the cost. If the change to the plans decreases the cost, any withdrawal of funds must be approved by the Director. Any decrease to the value of the financial assurance instrument must first be approved by the Director. The revised cost estimate must be adjusted for inflation as specified at paragraph (c)(2) of this section.	40 CFR §146.85(c)(3)	NONE	

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Whenever the current cost estimate increases to an amount greater than the face amount of a financial instrument currently in use, the owner or operator, within 60 days after the increase, must either cause the face amount to be increased to an amount at least equal to the current cost estimate and submit evidence of such increase to the Director, or obtain other financial responsibility instruments to cover the increase. Whenever the current cost estimate decreases, the face amount of the financial assurance instrument may be reduced to the amount of the current cost estimate only after the owner or operator has received written approval from the Director.	40 CFR §146.85(c)(4)	NONE	
The owner or operator must notify the Director by certified mail of adverse financial conditions such as bankruptcy that may affect the ability to carry out injection well plugging and post-injection site care and site closure.	40 CFR §146.85(d)	Chapter 24 Section 18(c). The owner or operator must notify the administrator of adverse financial conditions that may affect the ability to carry out injection well plugging and post-injection site care and site closure.	Similar. The state regulation does not specify the method of notification.
In the event that the owner or operator or the third party provider of a financial responsibility instrument is going through a bankruptcy, the owner or operator must notify the Director by certified mail of the commencement of a voluntary or involuntary proceeding under Title 11 (Bankruptcy), U.S. Code, naming the owner or operator as debtor, within 10 days after commencement of the proceeding.	40 CFR §146.85(d)(1)	NONE	
A guarantor of a corporate guarantee must make such a notification to the Director if he/she is named as debtor, as required under the terms of the corporate guarantee.	40 CFR §146.85(d)(2)	NONE	
An owner or operator who fulfills the requirements of paragraph (a) of this section by obtaining a trust fund, surety bond, letter of credit, escrow account, or insurance policy will be deemed to be without the required financial assurance in the event of bankruptcy of the trustee or issuing institution, or a suspension or revocation of the authority of the trustee institution to act as trustee of the institution issuing the trust fund, surety bond, letter of credit, escrow account, or insurance policy. The owner or operator must establish other financial assurance within 60 days after such an event.	40 CFR §146.85(d)(3)	NONE	

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
The owner or operator must provide an adjustment of the cost estimate to the Director within 60 days of notification by the Director, if the Director determines during the annual evaluation of the qualifying financial responsibility instrument(s) that the most recent demonstration is no longer adequate to cover the cost of corrective action (as required by §146.84), injection well plugging (as required by §146.92), post-injection site care and site closure (as required by §146.93), and emergency and remedial response (as required by §146.94).	40 CFR §146.85(e)	Chapter 24 Section 18(d). The operator must provide an adjustment of the cost estimate to the administrator if the administrator has reason to believe that the most recent demonstration is no longer adequate to cover the cost of injection well plugging (as required by Section 15) and post-injection site care and site closure (as required by Section 16).	The state regulation does not require adjustments to address changes in the cost of corrective action and emergency and remedial response. Also, the state regulation does not specify a timeframe to provide an adjustment of the cost estimate. The state regulation does not discuss annual evaluations of financial instruments.
The Director must approve the use and length of pay-in-periods for trust funds or escrow accounts.	40 CFR §146.85(f)	NONE	
40 CFR §146.86 Injection well construction requirements.			
<i>General.</i> The owner or operator must ensure that all Class VI wells are constructed and completed to:	40 CFR §146.86(a)	Chapter 24 Section 9(a). The owner or operator must ensure that all Class VI wells are designed, at a minimum, to the construction standards set forth by the department and the Wyoming oil and gas conservation commission, as applicable, and constructed and completed to:	Similar.
Prevent the movement of fluids into or between USDWs or into any unauthorized zones;	40 CFR §146.86(a)(1)	Chapter 24 Section 9(a)(i). Prevent the movement of fluids into or between USDWs or into any unauthorized zones;	Same.
Permit the use of appropriate testing devices and workover tools; and	40 CFR §146.86(a)(2)	Chapter 24 Section 9(a)(ii). Permit the use of appropriate testing devices and workover tools; and	Same.
Permit continuous monitoring of the annulus space between the injection tubing and long string casing.	40 CFR §146.86(a)(3)	Chapter 24 Section 9(a)(iii). Permit continuous monitoring of the annulus space between the injection tubing and long string casing.	Same.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
<i>Casing and Cementing of Class VI Wells.</i>	40 CFR §146.86(b)	Chapter 24 Section 9(b).	
Casing and cement or other materials used in the construction of each Class VI well must have sufficient structural strength and be designed for the life of the geologic sequestration project. All well materials must be compatible with fluids with which the materials may be expected to come into contact and must meet or exceed standards developed for such materials by the American Petroleum Institute, ASTM International, or comparable standards acceptable to the Director. The casing and cementing program must be designed to prevent the movement of fluids into or between USDWs. In order to allow the Director to determine and specify casing and cementing requirements, the owner or operator must provide the following information:	40 CFR §146.86(b)(1)	Chapter 24 Section 9(b)(i-iii). Casing and cement or other materials used in the construction of each Class VI well must have sufficient structural strength and be designed for the life of the well. All well materials must be compatible with fluids with which the materials may be expected to come into contact, and meet or exceed standards developed for such materials by the American Petroleum Institute, ASTM International, or comparable standards acceptable to the administrator. The casing and cementing program must be designed to prevent the movement of fluids into or between USDWs. In order to allow the administrator to determine and specify casing and cementing requirements, the owner or operator must provide the following information:	Same.
Depth to the injection zone(s);	40 CFR §146.86(b)(1)(i)	Chapter 24 Section 9(b)(iii)(A). Depth to the injection zone;	Same.
Injection pressure, external pressure, internal pressure, and axial loading;	40 CFR §146.86(b)(1)(ii)	Chapter 24 Section 9(b)(iii)(B). Injection pressure, external pressure, internal pressure and axial loading;	Same.
Hole size;	40 CFR §146.86(b)(1)(iii)	Chapter 24 Section 9(b)(iii)(C). Hole size;	Same.
Size and grade of all casing strings (wall thickness, external diameter, nominal weight, length, joint specification, and construction material);	40 CFR §146.86(b)(1)(iv)	Chapter 24 Section 9(b)(iii)(D). Size and grade of all casing strings (wall thickness, external diameter, nominal weight, length, joint specification and construction material), including whether the casing is new, or used;	Similar. Note that the state regulation appears to allow the use of used casing (this is not prohibited or addressed in the federal rule, but this should be noted).
Corrosiveness of the carbon dioxide stream and formation fluids;	40 CFR §146.86(b)(1)(v)	Chapter 24 Section 9(b)(iii)(E). Composition of the carbon dioxide stream, and formation fluids;	Similar, but the state regulation uses the word “composition” rather than “corrosiveness.”
Down-hole temperatures;	40 CFR §146.86(b)(1)(vi)	Chapter 24 Section 9(b)(iii)(F). Down-hole temperatures and pressures;	Similar.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Lithology of injection and confining zone(s);	40 CFR §146.86(b)(1)(vii)	Chapter 24 Section 9(b)(iii)(G). Lithology of injection and confining zones;	Same.
Type or grade of cement and cement additives; and	40 CFR §146.86(b)(1)(viii)	Chapter 24 Section 9(b)(iii)(H). Type or grade of cement and additives; and	Same.
Quantity, chemical composition, and temperature of the carbon dioxide stream.	40 CFR §146.86(b)(1)(ix)	Chapter 24 Section 9(b)(iii)(I). Quantity, chemical composition, and temperature of the carbon dioxide stream.	Same.
Surface casing must extend through the base of the lowermost USDW and be cemented to the surface through the use of a single or multiple strings of casing and cement.	40 CFR §146.86(b)(2)	Chapter 24 Section 9(b)(iv). Surface casing must extend through the base of the lowermost USDW above the injection zone and be cemented to the surface.	Similar; the state regulation requires surface casing be set through the base of the lowermost USDW <i>above the injection zone</i> . The state rule also does not allow for the use of a single or multiple strings of casing and cement LESS STRINGENT
At least one long string casing, using a sufficient number of centralizers, must extend to the injection zone and must be cemented by circulating cement to the surface in one or more stages.	40 CFR §146.86(b)(3)	Chapter 24 Section 9(b)(v). At least one long string casing, using a sufficient number of centralizers, must be set in a manner so as to create a cement bond through the overlying and/or underlying confining zones(s). The long string casing must extend to the injection zone and must be isolated by placing cement and/or other isolation techniques as necessary to provide adequate isolation of the injection zone and provide for protection of USDWs, human health, safety, and the environment.	The state regulation does not require circulating cement to the surface.
Circulation of cement may be accomplished by staging. The Director may approve an alternative method of cementing in cases where the cement cannot be recirculated to the surface, provided the owner or operator can demonstrate by using logs that the cement does not allow fluid movement behind the well bore.	40 CFR §146.86(b)(4)	Chapter 24 Section 9(b)(v). At least one long string casing, using a sufficient number of centralizers, must be set in a manner so as to create a cement bond through the overlying and/or underlying confining zones(s). The long string casing must extend to the injection zone and must be isolated by placing cement and/or other isolation techniques as necessary to provide adequate isolation of the injection zone and provide for protection of USDWs, human health, safety, and the environment.	The state regulation does not mention staging or requiring Director approval of an alternative method of cementing.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Cement and cement additives must be compatible with the carbon dioxide stream and formation fluids and of sufficient quality and quantity to maintain integrity over the design life of the geologic sequestration project. The integrity and location of the cement shall be verified using technology capable of evaluating cement quality radially and identifying the location of channels to ensure that USDWs are not endangered.	40 CFR §146.86(b)(5)	Chapter 24 Section 9(b)(vi-vii). Cement and cement additives must be suitable for use with the carbon dioxide stream and formation fluids and of sufficient quality and quantity to maintain integrity over the operating life of the well. The integrity and location of the cement shall be verified using technology capable of evaluating cement quality radially with sufficient resolution to identify the location of channels, voids, or other areas of missing cement to ensure that USDWs are not endangered and that human health, safety, and the environment are protected.	Similar.
<i>Tubing and packer.</i>	40 CFR §146.86(c)	Chapter 24 Section 9(c).	
Tubing and packer materials used in the construction of each Class VI well must be compatible with fluids with which the materials may be expected to come into contact and must meet or exceed standards developed for such materials by the American Petroleum Institute, ASTM International, or comparable standards acceptable to the Director.	40 CFR §146.86(c)(1)	NONE	Note that Chapter 24 Section 9(b) & (b)(i) says that all well materials must be compatible with fluids with which the materials may be expected to come into contact, and meet or exceed standards by API, ASTM International, etc.; however, this section does not specifically refer to tubing and packer. OKAY, tubing and packer is part of "well materials"
All owners or operators of Class VI wells must inject fluids through tubing with a packer set at a depth opposite a cemented interval at the location approved by the Director.	40 CFR §146.86(c)(2)	Chapter 24 Section 9(c). All owner and operators of Class VI wells must inject fluids through tubing with a packer set at a depth opposite a cemented interval at the location approved by the administrator.	Same.
In order for the Director to determine and specify requirements for tubing and packer, the owner or operator must submit the following information:	40 CFR §146.86(c)(3)	Chapter 24 Section 9(c)(i). In order for the administrator to determine and specify requirements for tubing and packer, the owner or operator must submit the following information:	Same.
Depth of setting;	40 CFR §146.86(c)(3)(i)	Chapter 24 Section 9(c)(i)(A). Depth of setting;	Same.
Characteristics of the carbon dioxide stream (chemical content, corrosiveness, temperature, and density) and formation fluids;	40 CFR §146.86(c)(3)(ii)	Chapter 24 Section 9(c)(i)(B). Characteristics of the carbon dioxide stream;	The state regulation does not require information on the characteristics of formation fluids. [except WY does talk about salinity of fluids] The state regulation does not specify characteristics of the carbon dioxide stream, e.g., chemical content, corrosiveness, temperature, and density.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Maximum proposed injection pressure;	40 CFR § 146.86(c)(3)(iii)	Chapter 24 Section 9(c)(i)(C). Maximum proposed injection pressure;	Same.
Maximum proposed annular pressure;	40 CFR § 146.86(c)(3)(iv)	Chapter 24 Section 9(c)(i)(D). Maximum proposed annular pressure;	Same.
Proposed injection rate (intermittent or continuous) and volume and/or mass of the carbon dioxide stream;	40 CFR § 146.86(c)(3)(v)	Chapter 24 Section 9(c)(i)(E). Maximum proposed injection rate (intermittent or continuous) and volume of the carbon dioxide stream;	Similar.
Size of tubing and casing; and	40 CFR § 146.86(c)(3)(vi)	Chapter 24 Section 9(c)(i)(F). Size of casing; and	The state regulation does not require information on the size of tubing.
Tubing tensile, burst, and collapse strengths.	40 CFR § 146.86(c)(3)(vii)	Chapter 24 Section 9(c)(i)(G). Tubing tensile, burst, and collapse strengths.	Same.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
40 CFR §146.87 Logging, sampling, and testing prior to injection well operation.			
During the drilling and construction of a Class VI injection well, the owner or operator must run appropriate logs, surveys and tests to determine or verify the depth, thickness, porosity, permeability, and lithology of, and the salinity of any formation fluids in all relevant geologic formations to ensure conformance with the injection well construction requirements under §146.86 and to establish accurate baseline data against which future measurements may be compared. The owner or operator must submit to the Director a descriptive report prepared by a knowledgeable log analyst that includes an interpretation of the results of such logs and tests. At a minimum, such logs and tests must include:	40 CFR §146.87(a)	Chapter 24 Section 10(a) & (a)(i). During the drilling and construction of a Class VI injection well, the owner or operator must run appropriate logs, surveys and tests to determine or verify the depth, thickness, porosity, permeability, and lithology of, and the salinity of any formation fluids within, for all relevant geologic formations in order to ensure conformance with the injection well construction requirements under Section 9, and to establish accurate baseline data against which future measurements may be compared. The owner or operator must submit to the administrator a descriptive report prepared by a knowledgeable log analyst that includes an interpretation of the results of such logs and tests. The administrator may require such logs and tests as may be needed after taking into account the availability of similar data in the area of the drilling site, the construction plan, and the need for additional information that may arise from time to time as the construction of the well progresses, and these may include the following:	The state regulation appears to allow the administrator to require or waive logs and tests, based on already available data. This may be less stringent than the federal rule. "must" vs "may"
Deviation checks during drilling on all holes constructed by drilling a pilot hole which is enlarged by reaming or another method. Such checks must be at sufficiently frequent intervals to determine the location of the borehole and to ensure that vertical avenues for fluid movement in the form of diverging holes are not created during drilling; and	40 CFR §146.87(a)(1)	Chapter 24 Section 10(a)(i)(A). Deviation checks measured during, or after drilling on all holes constructed by drilling a pilot hole which is subsequently enlarged by reaming or another method. Such checks must be at sufficiently frequent intervals to determine the location of the borehole and to ensure that vertical avenues for fluid movement in the form of diverging holes are not created during drilling; and	Similar. The state regulation has greater flexibility in that it allows for deviation checks not only during drilling, like in the federal rule, but also after drilling. This may be less protective since it would be harder to correct deviations after drilling is complete. IS LESS STRINGENT
Before and upon installation of the surface casing:	40 CFR §146.87(a)(2)	Chapter 24 Section 10(a)(i)(B). Before and upon installation of the surface casing, unless waived in writing by the administrator:	Similar. The state regulation may be less stringent; it allows the administrator to waive these logs and tests. IS LESS STRINGENT
Resistivity, spontaneous potential, and caliper logs before the casing is installed; and	40 CFR §146.87(a)(2)(i)	Chapter 24 Section 10(a)(i)(B)(I). Resistivity, spontaneous potential, and caliper logs before the casing is installed; and	Same.
A cement bond and variable density log to evaluate cement quality radially, and a temperature log after the casing is set and cemented.	40 CFR §146.87(a)(2)(ii)	Chapter 24 Section 10(a)(i)(B)(II). Cement evaluation logs, after the casing is set and cemented, to evaluate cement quality radially with sufficient resolution to identify channels, voids, or other areas of missing cement.	The state regulation does not specify which cement evaluation logs are required, e.g., cement bond and variable density log. Also, the state regulation does not include the requirement to conduct a temperature log after the surface casing is set and cemented.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Before and upon installation of the long string casing:	40 CFR §146.87(a)(3)	Chapter 24 Section 10(a)(i)(C). Before and upon installation of the long string casing:	Same.
Resistivity, spontaneous potential, porosity, caliper, gamma ray, fracture finder logs, and any other logs the Director requires for the given geology before the casing is installed; and	40 CFR §146.87(a)(3)(i)	Chapter 24 Section 10(a)(i)(C)(I). Resistivity, spontaneous potential, porosity, caliper, gamma ray, fracture finder logs, and any other logs the administrator requires for the given geology before the casing is installed; and	Same.
A cement bond and variable density log, and a temperature log after the casing is set and cemented.	40 CFR §146.87(a)(3)(ii)	Chapter 24 Section 10(a)(i)(C)(II). A cement bond and variable density log, and a temperature log after the casing is set and cemented.	Same.
A series of tests designed to demonstrate the internal and external mechanical integrity of injection wells, which may include:	40 CFR §146.87(a)(4)	Chapter 24 Section 10(a)(i)(D). Test(s) designed to demonstrate the internal and external mechanical integrity of injection wells, which may include:	Same.
A pressure test with liquid or gas;	40 CFR §146.87(a)(4)(i)	Chapter 24 Section 10(a)(i)(D)(I). A pressure test with liquid or gas;	Same.
A tracer survey such as oxygen-activation logging;	40 CFR §146.87(a)(4)(ii)	Chapter 24 Section 10(a)(i)(D)(II). Diagnostic tools, such as oxygen-activation logging;	Similar.
A temperature or noise log;	40 CFR §146.87(a)(4)(iii)	Chapter 24 Section 10(a)(i)(D)(III). A temperature or noise log; and	Same.
A casing inspection log; and	40 CFR §146.87(a)(4)(iv)	Chapter 24 Section 10(a)(i)(D)(IV). A casing inspection log.	Same.
Any alternative methods that provide equivalent or better information and that are required by and/or approved of by the Director.	40 CFR §146.87(a)(5)	Chapter 24 Section 10(a)(i)(E). Any alternative methods that provide equivalent or better information and that are required of, and/or approved by the administrator.	Same.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
The owner or operator must take whole cores or sidewall cores of the injection zone and confining system and formation fluid samples from the injection zone(s), and must submit to the Director a detailed report prepared by a log analyst that includes: well log analyses (including well logs), core analyses, and formation fluid sample information. The Director may accept information on cores from nearby wells if the owner or operator can demonstrate that core retrieval is not possible and that such cores are representative of conditions at the well. The Director may require the owner or operator to core other formations in the borehole.	40 CFR §146.87(b)	Chapter 24 Section 10(b). The owner or operator must take and submit to the administrator a report describing whole cores or sidewall cores of the injection zone and confining system, and formation fluid samples from the injection zone(s). The administrator may accept data from cores and fluid samples from nearby wells if the owner or operator can demonstrate that such data are representative of conditions in the wellbore.	Similar. The state regulation does not specify what must be included in the report, e.g., well log analyses (including well logs), core analyses, and formation fluid sample information Or that the report be prepared by a log analyst. The state regulation and federal rule both accept information on cores from nearby wells if such data are representative of conditions in the well. However, the state regulation does not include the other stipulation: if the owner or operator can demonstrate that core retrieval is not possible in the injection zone and confining system. NEED The state regulation does not allow the Director or administrator to require the owner or operator to core other formations in the borehole.
The owner or operator must record the fluid temperature, pH, conductivity, reservoir pressure, and static fluid level of the injection zone(s).	40 CFR §146.87(c)	Chapter 24 Section 10(c). Prior to injection well operation, the owner or operator must record the formation temperature, formation fluid pH and conductivity, and reservoir pressure of the injection zone(s).	Similar, however, the state regulation does not require the operator to record the static fluid level of the injection zone(s). you can use the static fluid level to get reservoir pressure, really the same thing
At a minimum, the owner or operator must determine or calculate the following information concerning the injection and confining zone(s):	40 CFR §146.87(d)	Chapter 24 Section 10(d). At any time prior to injection well operation, the owner or operator must determine fracture pressures of the injection and confining zones and conduct tests to verify hydrogeologic and geo-mechanical characteristics of the injection zone, e.g., injectivity tests.	Similar.
Fracture pressure;	40 CFR §146.87(d)(1)	Chapter 24 Section 10(d). At any time prior to injection well operation, the owner or operator must determine fracture pressures of the injection and confining zones and conduct tests to verify hydrogeologic and geo-mechanical characteristics of the injection zone, e.g., injectivity tests.	Same.
Other physical and chemical characteristics of the injection and confining zone(s); and	40 CFR §146.87(d)(2)	NONE	
Physical and chemical characteristics of the formation fluids in the injection zone(s).	40 CFR §146.87(d)(3)	NONE	

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Upon completion, but prior to operation, the owner or operator must conduct the following tests to verify hydrogeologic characteristics of the injection zone(s):	40 CFR §146.87(e)	Chapter 24 Section 10(d). At any time prior to injection well operation, the owner or operator must determine fracture pressures of the injection and confining zones and conduct tests to verify hydrogeologic and geo-mechanical characteristics of the injection zone, e.g., injectivity tests.	Similar.
A pressure fall-off test; and,	40 CFR §146.87(e)(1)	Chapter 24 Section 10(d).	The state regulation requires tests to verify hydrogeologic and geo-mechanical characteristics of the injection zone, but does not specifically require a pressure fall-off test.
A pump test; or	40 CFR §146.87(e)(2)	Chapter 24 Section 10(d).	The state regulation requires tests to verify hydrogeologic and geo-mechanical characteristics of the injection zone, but does not specifically require a pump test.
Injectivity tests.	40 CFR §146.87(e)(3)	Chapter 24 Section 10(d).	The state regulation requires tests to verify hydrogeologic and geo-mechanical characteristics of the injection zone and provides injectivity tests as an example, but does not explicitly require injectivity tests.
The owner or operator must provide the Director with the opportunity to witness all logging and testing by this subpart. The owner or operator must submit a schedule of such activities to the Director 30 days prior to conducting the first test and submit any changes to the schedule 30 days prior to the next scheduled test.	40 CFR §146.87(f)	Chapter 24 Section 10(e). The owner or operator must provide the administrator with the opportunity to witness all logging and testing by this subpart. The owner or operator must submit a schedule of such activities to the administrator upon spudding the well and notify the administrator of any changes to the schedule at least 48 hours prior to the scheduled test.	The state regulation appears less stringent than the federal rule in its notification requirements about its logging and testing schedule. The federal rule requires a schedule of such activities 30 days prior to conducting the first test, and the state regulation requires a schedule of such activities upon spudding the well. The time between spudding and logging is probably less than 30 days. Also, the state rule requires a shorter notification time for submission of any changes to the schedule (48 hours prior to the scheduled test vs. 30 days in the federal rule).

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
40 CFR §146.88 Injection well operating requirements.			
Except during stimulation, the owner or operator must ensure that injection pressure does not exceed 90 percent of the fracture pressure of the injection zone(s) so as to ensure that the injection does not initiate new fractures or propagate existing fractures in the injection zone(s). In no case may injection pressure initiate fractures in the confining zone(s) or cause the movement of injection or formation fluids that endangers a USDW. Pursuant to requirements at §146.82(a)(9), all stimulation programs must be approved by the Director as part of the permit application and incorporated into the permit.	40 CFR §146.88(a)	<p>Chapter 24 Section 11(a).</p> <p>The owner or operator must comply with a maximum injection pressure limit approved by the Director and specified in the permit. In approving a maximum injection pressure limit, the Director shall consider the results of well tests and, where appropriate, geomechanical or other studies that assess the risks of tensile failure and shear failure. The Director shall approve limits that, with a reasonable degree of certainty, will avoid initiation or propagation of fractures in the confining zone or cause non-transmissive faults transecting the confining zone to become transmissive. In no case may injection pressure cause movement of injection or formation fluids in a manner that endangers a USDW, or otherwise threatens human health, safety, or the environment.</p> <p>In no case may injection pressure initiate fractures in the confining zone(s) or cause the movement of injectate or formation fluids that endangers a USDW or otherwise threatens human health, safety, or the environment.</p> <p>Chapter 24 Section 5(b)(xvii).</p> <p>A complete application for a Class VI well shall include a proposed stimulation program and a determination that stimulation will not compromise containment.</p>	<p>The state regulation does not set a limit on the injection pressure as a percentage of the fracture pressure of the injection zone.</p> <p>The state regulation does not require that the stimulation program be approved by the director and incorporated into the permit.</p>
Injection between the outermost casing protecting USDWs and the well bore is prohibited.	40 CFR §146.88(b)	<p>Chapter 24 Section 11(b).</p> <p>Injection of the carbon dioxide stream between the outermost casing protecting USDWs and the well bore is prohibited.</p>	Same.
The owner or operator must fill the annulus between the tubing and the long string casing with a non-corrosive fluid approved by the Director. The owner or operator must maintain on the annulus a pressure that exceeds the operating injection pressure, unless the Director determines that such requirement might harm the integrity of the well or endanger USDWs.	40 CFR §146.88(c)	<p>Chapter 24 Section 11(c).</p> <p>The owner or operator must fill the annulus between the tubing and the long string casing with a non-corrosive fluid approved by the administrator.</p> <p>The owner or operator must maintain a positive pressure on the annulus.</p>	The state regulation does not include the stipulation that the owner or operator maintain a pressure on the annulus that exceeds the operating injection pressure.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Other than during periods of well workover (maintenance) approved by the Director in which the sealed tubing-casing annulus is disassembled for maintenance or corrective procedures, the owner or operator must maintain mechanical integrity of the injection well at all times.	40 CFR §146.88(d)	Chapter 24 Section 11(d). Other than during periods of well workover (maintenance) approved by the administrator in which the sealed tubing-casing annulus is, by necessity, disassembled for maintenance or corrective procedures, the owner or operator must maintain mechanical integrity of the injection well at all times.	Same.
The owner or operator must install and use:	40 CFR §146.88(e)	Chapter 24 Section 11(e-g).	
Continuous recording devices to monitor: the injection pressure; the rate, volume and/or mass, and temperature of the carbon dioxide stream; and the pressure on the annulus between the tubing and the long string casing and annulus fluid volume; and	40 CFR §146.88(e)(1)	Chapter 24 Section 11(e-f). The owner or operator must install and use continuous recording devices to monitor injection pressure; and rate, volume, and temperature of the carbon dioxide stream. The owner or operator must regularly monitor the pressure on the annulus between the tubing and the long string casing and annulus fluid volume.	The state regulation requires regular monitoring (and not continuous monitoring like in the federal rule) of the pressure on the annulus between the tubing and the long string casing. 13(b)(iii)(C)-install and use of continuous recording device is required – may need to resolve discrepancy
Alarms and automatic surface shut-off systems or, at the discretion of the Director, down-hole shut-off systems (e.g., automatic shut-off, check valves) for onshore wells or, other mechanical devices that provide equivalent protection; and	40 CFR §146.88(e)(2)	Chapter 24 Section 11(g). The owner or operator must install, test, and use alarms and automatic shut-off systems, designed to alert the operator and shut-in the well when operating parameters such as injection rate, injection pressure, or other parameters approved by the administrator diverge beyond ranges and/or gradients specified in the permit.	The state regulation does not specify whether the shut-off systems should be surface or down-hole.
Alarms and automatic down-hole shut-off systems for wells located offshore but within State territorial waters, designed to alert the operator and shut-in the well when operating parameters such as annulus pressure, injection rate, or other parameters diverge beyond permitted ranges and/or gradients specified in the permit.	40 CFR §146.88(e)(3)	NONE	Wyoming does not have any offshore wells.
If a shutdown (i.e., down-hole or at the surface) is triggered or a loss of mechanical integrity is discovered, the owner or operator must immediately investigate and identify as expeditiously as possible the cause of the shutoff. If, upon such investigation, the well appears to be lacking mechanical integrity, or if monitoring required under paragraph (e) of this section otherwise indicates that the well may be lacking mechanical integrity, the owner or operator must:	40 CFR §146.88(f)	Chapter 24 Section 11(h) & (h)(i). If an automatic shutdown is triggered or a loss of mechanical integrity is discovered, the owner or operator must immediately investigate and identify as expeditiously as possible the cause. If, upon such investigation, the well appears to be lacking mechanical integrity, or if monitoring required under paragraphs (e), (f), and (g) of this section otherwise indicates that the well may be lacking mechanical integrity, the owner or operator must:	Same.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Immediately cease injection;	40 CFR §146.88(f)(1)	Chapter 24 Section 11(h)(i)(A). Immediately cease injection;	Same.
Take all steps reasonably necessary to determine whether there may have been a release of the injected carbon dioxide stream or formation fluids into any unauthorized zone;	40 CFR §146.88(f)(2)	Chapter 24 Section 11(h)(i)(B). Take all steps reasonably necessary to determine whether there may have been a release of the injected carbon dioxide stream into any unauthorized zone;	The state regulation does not mention the release of <i>formation fluids</i> into unauthorized zones.
Notify the Director within 24 hours;	40 CFR §146.88(f)(3)	Chapter 24 Section 11(h)(i)(C). Notify the administrator within 24 hours of discovery;	Similar, although notification within 24 hours of <i>discovery</i> may be less stringent (some commenters argued for this and EPA rejected it).
Restore and demonstrate mechanical integrity to the satisfaction of the Director prior to resuming injection; and	40 CFR §146.88(f)(4)	Chapter 24 Section 11(h)(i)(D). Restore and demonstrate mechanical integrity to the satisfaction of the administrator as soon as practicable and prior to resuming injection; and	Similar.
Notify the Director when injection can be expected to resume.	40 CFR §146.88(f)(5)	Chapter 24 Section 11(h)(i)(E). Notify the administrator when injection can be expected to resume.	Same.
40 CFR §146.89 Mechanical integrity.			
A Class VI well has mechanical integrity if:	40 CFR §146.89(a)	Chapter 24 Section 12(a). A Class VI well has mechanical integrity if:	Same.
There is no significant leak in the casing, tubing, or packer; and	40 CFR §146.89(a)(1)	Chapter 24 Section 12(a)(i). There is no significant leak in the casing, tubing or packer; and	Same.
There is no significant fluid movement into a USDW through channels adjacent to the injection well bore.	40 CFR §146.89(a)(2)	Chapter 24 Section 12(a)(ii). There is no significant fluid movement into a USDW through channels adjacent to the injection well bore.	Same.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
To evaluate the absence of significant leaks under paragraph (a)(1) of this section, owners or operators must, following an initial annulus pressure test, continuously monitor injection pressure, rate, injected volumes; pressure on the annulus between tubing and long-string casing; and annulus fluid volume as specified in §146.88 (e);	40 CFR §146.89(b)	Chapter 24 Section 12(b). To evaluate the absence of significant leaks under paragraph (a)(i) of this section, owners or operators must, following an initial annulus pressure test, monitor injection pressure, rate, injected volumes, and pressure on the annulus between tubing and long string casing and annulus fluid volume as specified in Section 11 (e) and (f);	The state regulation, at Chapter 24 Section 12(b), does not specifically require continuous monitoring. The state regulation, at Section 11(e-f), requires continuous monitoring of injection pressure, rate, volume, and temperature of the carbon dioxide stream, and regular (not continuous) monitoring of the pressure on the annulus between the tubing and the long string casing and annulus fluid volume.
At least once per year, the owner or operator must use one of the following methods to determine the absence of significant fluid movement under paragraph (a)(2) of this section:	40 CFR §146.89(c)	Chapter 24 Section 12(c). At least once per year, the owner or operator must confirm the absence of significant fluid movement under paragraph (a)(ii) of this section using a method acceptable to the administrator (e.g., diagnostic surveys such as oxygen-activation or temperature or noise logs).	Similar. Allows Administrator's discretion and less stringent
An approved tracer survey such as an oxygen-activation log; or	40 CFR §146.89(c)(1)	Chapter 24 Section 12(c).	Similar, however, the state regulation could be interpreted as being slightly less specific. Less stringent
A temperature or noise log.	40 CFR §146.89(c)(2)	Chapter 24 Section 12(c).	Similar, however, the state regulation could be interpreted as being slightly less specific. Less stringent
If required by the Director, at a frequency specified in the testing and monitoring plan required at §146.90, the owner or operator must run a casing inspection log to determine the presence or absence of corrosion in the long-string casing.	40 CFR §146.89(d)	NONE	The state regulation does allow the administrator to require additional or alternative tests at Chapter 24 Section 12(d) or (f), but does not have a specific requirement for a casing inspection log.
The Director may require any other test to evaluate mechanical integrity under paragraphs (a)(1) or (a)(2) of this section. Also, the Director may allow the use of a test to demonstrate mechanical integrity other than those listed above with the written approval of the Administrator. To obtain approval for a new mechanical integrity test, the Director must submit a written request to the Administrator setting forth the proposed test and all technical data supporting its use. The Administrator may approve the request if he or she determines that it will reliably demonstrate the mechanical integrity of wells for which its use is proposed. Any alternate method approved by the Administrator will be published in the <i>Federal Register</i> and may be used in all States in accordance with applicable State law unless its use is restricted at the time of approval by the Administrator.	40 CFR §146.89(e)	Chapter 24 Section 12(d) & (d)(i). The administrator may require any other test to evaluate mechanical integrity under paragraph (a)(i) or (a)(ii) of this section. Also, the administrator may allow the use of a test to demonstrate mechanical integrity other than those listed above, with the written approval of the US EPA administrator. To obtain approval, the administrator must submit a written request to the US EPA Administrator, which must set forth the proposed test and all technical data supporting its use.	Same.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
In conducting and evaluating the tests enumerated in this section or others to be allowed by the Director, the owner or operator and the Director must apply methods and standards generally accepted in the industry. When the owner or operator reports the results of mechanical integrity tests to the Director, he/she shall include a description of the test(s) and the method(s) used. In making his/her evaluation, the Director must review monitoring and other test data submitted since the previous evaluation.	40 CFR §146.89(f)	Chapter 24 Section 12(e). In conducting and evaluating the tests enumerated in this section or others to be allowed by the administrator, the owner or operator and the administrator must apply methods and standards generally accepted in the industry. When the owner or operator reports the results of mechanical integrity tests to the administrator, he/she shall include a description of the test(s) and the method(s) used. In making his/her evaluation, the administrator must review monitoring and other test data submitted since the previous evaluation.	Same.
The Director may require additional or alternative tests if the results presented by the owner or operator under paragraphs (a) through (d) of this section are not satisfactory to the Director to demonstrate that there is no significant leak in the casing, tubing, or packer, or to demonstrate that there is no significant movement of fluid into a USDW resulting from the injection activity as stated in paragraphs (a)(1) and (2) of this section.	40 CFR §146.89(g)	Chapter 24 Section 12(f). The administrator may require additional or alternative tests if the results presented by the owner or operator under paragraph (e) of this section are not satisfactory to the administrator to demonstrate that there is no significant leak in the casing, tubing or packer, or significant movement of fluid into or between USDWs resulting from the injection activity as stated in paragraphs (a)(i) and (a)(ii) of this section.	Same.
40 CFR §146.90 Testing and monitoring requirements.			
The owner or operator of a Class VI well must prepare, maintain, and comply with a testing and monitoring plan to verify that the geologic sequestration project is operating as permitted and is not endangering USDWs. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit. The testing and monitoring plan must be submitted with the permit application, for Director approval, and must include a description of how the owner or operator will meet the requirements of this section, including accessing sites for all necessary monitoring and testing during the life of the project. Testing and monitoring associated with geologic sequestration projects must, at a minimum, include:	40 CFR §146.90	Chapter 24 Section 13(a), (a)(i), & (b). The owner or operator of a Class VI well must prepare, maintain, and comply with a testing and monitoring plan to verify that the geologic sequestration project is operating as permitted and is not endangering USDWs. The testing and monitoring plan must be submitted with the permit application, for administrator approval, and must include a description of how the owner or operator will meet the requirements of this section. Testing and monitoring associated with geologic sequestration projects must, at a minimum, include:	The state regulation does not include a provision stating that “the requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit.” The state regulation does not specify that the plan address site access for all necessary monitoring and testing during the life of the project.
Analysis of the carbon dioxide stream with sufficient frequency to yield data representative of its chemical and physical characteristics;	40 CFR §146.90(a)	Chapter 24 Section 13(b)(ii). Analysis of the carbon dioxide stream with sufficient frequency to yield data representative of its chemical and physical characteristics;	Same.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Installation and use, except during well workovers as defined in §146.88(d), of continuous recording devices to monitor injection pressure, rate, and volume; the pressure on the annulus between the tubing and the long string casing; and the annulus fluid volume added;	40 CFR §146.90(b)	Chapter 24 Section 13(b)(iii-iv). Installation and use, except during well workovers, of continuous recording devices to monitor: -Injection pressure, -Rate and volume; -Pressure on the annulus between the tubing and the long string casing; and Recording, at least daily, the pressure on the annulus between the tubing and the long string casing.	Both the state regulation and the federal rule require continuous monitoring of the pressure on the annulus between the tubing and the long string casing (if you use Chapter 24 Section 13(b)(iii)). However, there appears to be a conflict in the state regulation regarding the frequency of monitoring the pressure on the annulus between the tubing and the long string casing. Chapter 24 Section 11(f) requires regular (not continuous) monitoring of the pressure on the annulus between the tubing and the long string casing. The state rule does not include monitoring of annulus fluid volume added.
Corrosion monitoring of the well materials for loss of mass, thickness, cracking, pitting, and other signs of corrosion, which must be performed on a quarterly basis to ensure that the well components meet the minimum standards for material strength and performance set forth in §146.86(b), by:	40 CFR §146.90(c)	Chapter 24 Section 13(b)(v). Corrosion monitoring of the well materials for loss of mass, thickness, cracking, pitting and other signs of corrosion must be performed and recorded at least quarterly (or less frequently as approved by the administrator, based on construction materials, operating conditions, and monitoring history) to ensure that the well components meet the minimum standards for material strength and performance set forth in Section 9(b) by:	The state regulation is less stringent; it allows the director to approve less frequent corrosion monitoring.
Analyzing coupons of the well construction materials placed in contact with the carbon dioxide stream; or	40 CFR §146.90(c)(1)	Chapter 24 Section 13(b)(v)(A). Analyzing coupons of the well construction materials placed in contact with the carbon dioxide stream; or	Same.
Routing the carbon dioxide stream through a loop constructed with the material used in the well and inspecting the materials in the loop; or	40 CFR §146.90(c)(2)	Chapter 24 Section 13(b)(v)(B). Routing the carbon dioxide stream through a loop constructed with the material used in the well and inspecting the materials in the loop; or	Same.
Using an alternative method approved by the Director;	40 CFR §146.90(c)(3)	Chapter 24 Section 13(b)(v)(C). Using an alternative method, materials, or time period approved by the administrator.	Similar.
Periodic monitoring of the ground water quality and geochemical changes above the confining zone(s) that may be a result of carbon dioxide movement through the confining zone(s) or additional identified zones including:	40 CFR §146.90(d)	Chapter 24 Section 13(b)(vi). Periodic monitoring of the reservoir fluid quality in a permeable and porous formation as near as practicable to the confining zone(s) for geochemical changes that may be a result of carbon dioxide or displaced formation fluid movement:	Similar.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
The location and number of monitoring wells based on specific information about the geologic sequestration project, including injection rate and volume, geology, the presence of artificial penetrations, and other factors; and	40 CFR §146.90(d)(1)	Chapter 24 Section 13(b)(vi)(A). The location and number of monitoring wells must be based on specific information about the geologic sequestration project, including injection rate and volume, geology, the presence of artificial penetrations and other relevant factors; and	Same.
The monitoring frequency and spatial distribution of monitoring wells based on baseline geochemical data that has been collected under §146.82(a)(6) and on any modeling results in the area of review evaluation required by §146.84(c).	40 CFR §146.90(d)(2)	Chapter 24 Section 13(b)(vi)(B). The monitoring frequency and spatial distribution of monitoring wells must be based on geological, geochemical, and geophysical data that has been collected under Section 5(b)(xi) and any modeling results in the area of review evaluation required by Section 8(c).	Similar. Sections must be same as referenced Fed regs
A demonstration of external mechanical integrity pursuant to §146.89(c) at least once per year until the injection well is plugged; and, if required by the Director, a casing inspection log pursuant to requirements at §146.89(d) at a frequency established in the testing and monitoring plan;	40 CFR §146.90(e)	Chapter 24 Section 13(b)(vii). A demonstration of external mechanical integrity pursuant to Section 12(c) at least once per year until the well is plugged;	The state regulation does not specifically require a casing inspection log; however, that provision is optional in the federal rule. The state regulation does allow the administrator to require additional or alternative tests at Chapter 24 Section 12(d) or (f), but does not include the specific requirement for a casing inspection log. Sect 12c not same as 146.89(c)
A pressure fall-off test at least once every five years unless more frequent testing is required by the Director based on site-specific information;	40 CFR §146.90(f)	Chapter 24 Section 13(b)(viii). A pressure fall-off test or other equivalent test that identifies reservoir conditions with respect to flow dynamics at least once every five years unless more frequent testing is required by the administrator based on site specific information; and	The state regulation allows other equivalent tests to replace the pressure fall-off test.
Testing and monitoring to track the extent of the carbon dioxide plume and the presence or absence of elevated pressure (e.g., the pressure front) by using:	40 CFR §146.90(g)	Chapter 24 Section 13(b)(ix). Testing and monitoring to track the extent of the carbon dioxide plume, the position of the pressure front, and surface displacement.	Similar. However, the state regulation does not specify that direct or geophysical methods must be used.
Direct methods in the injection zone(s); and,	40 CFR §146.90(g)(1)	NONE	See above. NEED
Indirect methods (e.g., seismic, electrical, gravity, or electromagnetic surveys and/or down-hole carbon dioxide detection tools), unless the Director determines, based on site-specific geology, that such methods are not appropriate;	40 CFR §146.90(g)(2)	NONE	See above. NEED

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
The Director may require surface air monitoring and/or soil gas monitoring to detect movement of carbon dioxide that could endanger a USDW.	40 CFR §146.90(h)	Chapter 24 Section 13(b)(x). At the administrator's discretion, based on site-specific conditions, surface air monitoring and/or soil gas monitoring to detect movement of carbon dioxide that could endanger a USDW, or otherwise threaten human health, safety, or the environment.	Similar.
Design of Class VI surface air and/or soil gas monitoring must be based on potential risks to USDWs within the area of review;	40 CFR §146.90(h)(1)	Chapter 24 Section 13(b)(x)(A). The testing and monitoring plan must be based on site-specific geologic factors, and modeling within the area of review;	Similar. Not similar enough
The monitoring frequency and spatial distribution of surface air monitoring and/or soil gas monitoring must be decided using baseline data, and the monitoring plan must describe how the proposed monitoring will yield useful information on the area of review delineation and/or compliance with standards under §144.12 of this chapter;	40 CFR §146.90(h)(2)	Chapter 24 Section 13(b)(x)(B). The monitoring frequency and spatial distribution of surface air monitoring and/or soil gas monitoring must reflect baseline data. The monitoring plan must specify how the proposed monitoring will yield useful information on the area of review delineation and the potential movement of fluid containing any contaminant into USDWs in exceedence of any primary drinking water regulation under 40 CFR Part 142, or which may otherwise adversely affect human health, safety, or the environment.	Similar. Note that the state rule refers to 40 CFR Part 142, and should refer to 40 CFR Part 141 (there is a typo in 144.12(a)).
If an owner or operator demonstrates that monitoring employed under §§98.440 to 98.449 of this chapter (Clean Air Act, 42 U.S.C. 7401 et seq.) accomplishes the goals of (h)(1) and (2) of this section, and meets the requirements pursuant to §146.91(c)(5), a Director that requires surface air/soil gas monitoring must approve the use of monitoring employed under §§98.440 to 98.449 of this chapter. Compliance with §§98.440 to 98.449 of this chapter pursuant to this provision is considered a condition of the Class VI permit;	40 CFR §146.90(h)(3)	NONE	NEED
Any additional monitoring, as required by the Director, necessary to support, upgrade, and improve computational modeling of the area of review evaluation required under §146.84(c) and to determine compliance with standards under §144.12 of this chapter;	40 CFR §146.90(i)	Chapter 24 Section 13(b)(xi). Any additional monitoring, as required by the administrator, necessary to support, upgrade, and improve computational modeling of the area of review re-evaluation required under Section 8(e) and as necessary to demonstrate that there is no movement of fluid containing any contaminant into underground sources of drinking water in exceedence of any primary drinking water regulation under 40 CFR Part 142, or which could otherwise adversely affect human health, safety, or the environment; and	Similar. Note that the state rule refers to 40 CFR Part 142, and should refer to 40 CFR Part 141 (there is a typo in 144.12(a)).

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
The owner or operator shall periodically review the testing and monitoring plan to incorporate monitoring data collected under this subpart, operational data collected under §146.88, and the most recent area of review reevaluation performed under §146.84(e). In no case shall the owner or operator review the testing and monitoring plan less often than once every five years. Based on this review, the owner or operator shall submit an amended testing and monitoring plan or demonstrate to the Director that no amendment to the testing and monitoring plan is needed. Any amendments to the testing and monitoring plan must be approved by the Director, must be incorporated into the permit, and are subject to the permit modification requirements at §§144.39 or 144.41 of this chapter, as appropriate. Amended plans or demonstrations shall be submitted to the Director as follows:	40 CFR §146.90(j)	NONE	NEED
Within one year of an area of review reevaluation;	40 CFR §146.90(j)(1)	NONE	NEED
Following any significant changes to the facility, such as addition of monitoring wells or newly permitted injection wells within the area of review, on a schedule determined by the Director; or	40 CFR §146.90(j)(2)	NONE	NEED
When required by the Director.	40 CFR §146.90(j)(3)	NONE	NEED
A quality assurance and surveillance plan for all testing and monitoring requirements.	40 CFR §146.90(k)	Chapter 24 Section 13(b)(xii). A quality assurance and surveillance plan for all testing and monitoring requirements.	Same.
40 CFR §146.91 Reporting requirements.			
The owner or operator must, at a minimum, provide, as specified in paragraph (e) of this section, the following reports to the Director, for each permitted Class VI well:	40 CFR §146.91	Chapter 24 Section 14(a). The owner or operator must, at a minimum, provide the following reports to the administrator, for each permitted Class VI well:	Same.
Semi-annual reports containing:	40 CFR §146.91(a)	Chapter 24 Section 14(a)(i). Semi-annual reports (or less frequent at the discretion of the administrator) containing:	The state regulation allows less frequent reports at the discretion of the administrator.
Any changes to the physical, chemical, and other relevant characteristics of the carbon dioxide stream from the proposed operating data;	40 CFR §146.91(a)(1)	Chapter 24 Section 14(a)(i)(A). Any changes to the physical, chemical and other relevant characteristics of the carbon dioxide stream from the proposed operating data;	Same.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Monthly average, maximum, and minimum values for injection pressure, flow rate and volume, and annular pressure;	40 CFR §146.91(a)(2)	Chapter 24 Section 14(a)(i)(B). Monthly average, maximum and minimum values for injection pressure, flow rate and volume, and annular pressure;	Same.
A description of any event that exceeds operating parameters for annulus pressure or injection pressure specified in the permit;	40 CFR §146.91(a)(3)	Chapter 24 Section 14(a)(i)(C). A description of any event that exceeds operating parameters for annulus pressure or injection pressure as specified in the permit;	Same.
A description of any event which triggers a shut-off device required pursuant to §146.88(e) and the response taken;	40 CFR §146.91(a)(4)	Chapter 24 Section 14(a)(i)(D). A description of any event which triggers a shutdown device required pursuant to Section 11(g), and the response taken;	Similar.
The monthly volume and/or mass of the carbon dioxide stream injected over the reporting period and the volume injected cumulatively over the life of the project;	40 CFR §146.91(a)(5)	Chapter 24 Section 14(a)(i)(E). The monthly volume of the carbon dioxide stream injected over the reporting period and project cumulatively;	Similar.
Monthly annulus fluid volume added; and	40 CFR §146.91(a)(6)	Chapter 24 Section 14(a)(i)(F). Monthly annulus fluid volume added; and	Same.
The results of monitoring prescribed under §146.90.	40 CFR §146.91(a)(7)	Chapter 24 Section 14(a)(i)(G). The results of monitoring prescribed under Section 13.	Same.
Report, within 30 days, the results of:	40 CFR §146.91(b)	Chapter 24 Section 14(a)(ii). Report, within 30 days the results of:	Same.
Periodic tests of mechanical integrity;	40 CFR §146.91(b)(1)	Chapter 24 Section 14(a)(ii)(A). Periodic tests of mechanical integrity;	Same.
Any well workover; and,	40 CFR §146.91(b)(2)	Chapter 24 Section 14(a)(ii)(C). Any well workover.	Same.
Any other test of the injection well conducted by the permittee if required by the Director.	40 CFR §146.91(b)(3)	Chapter 24 Section 14(a)(ii)(B). Any other test of the injection well conducted by the permittee if required by the administrator; and	Same.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Report, within 24 hours:	40 CFR §146.91(c)	NONE	The state regulation does not include any 24-hour reporting requirements in the reporting section (Section 14), although some other sections require 24-hour notice, and the state rule is less stringent than the federal rule in reporting any failures, noncompliance, or possibilities of endangerment to a USDW. The 24 hour notice is required throughout the regs – in some cases they are less stringent, but where they exist do they need to be in the reporting requirements?
Any evidence that the injected carbon dioxide stream or associated pressure front may cause an endangerment to a USDW;	40 CFR §146.91(c)(1)	Chapter 24 Section 17(b)(iii) If monitoring data, or other evidence obtained by the the owner or operator indicate that the injected carbon dioxide stream, displaced formation fluids or associated pressure front endangers a USDW or threatens human health, safety, or the environment, the owner or operator must: As soon as practical, provide verbal notice to the department of environmental quality of any excursion after the excursion is discovered, followed by written notice to all surface owners, mineral claimants, mineral owners, lessees and other owners of record of subsurface interests within thirty (30) days of when the excursion is discovered; and	The state regulation does not require notice in 24 hours (only as soon as practical).
Any noncompliance with a permit condition, or malfunction of the injection system, which may cause fluid migration into or between USDWs;	40 CFR §146.91(c)(2)	Chapter 24 Section 4(c)(i)(R) All individual permits issued under this chapter shall contain the following conditions: a requirement that confirmed noncompliance resulting in the migration of injected fluid into any zone outside of the permitted receiver must be orally reported to the administrator within 24 hours, and a written submission shall be provided within 5 days of the time the permittee becomes aware of the excursion. . .	The state regulation is slightly less stringent. It requires notification only if noncompliance results in migration outside the injection zone, whereas the federal rule requires notification for any noncompliance which <i>may</i> cause migration.
Any triggering of a shut-off system (i.e., down-hole or at the surface);	40 CFR §146.91(c)(3)	NONE	Automatic shutdowns require the owner or operator to immediately investigate and identify the cause (Section 11(h)), but do not require 24 hour notification to the administrator. Requires 24 hr notification if alarm sounded due to MI failure, not as stringent

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Any failure to maintain mechanical integrity; or.	40 CFR §146.91(c)(4)	Chapter 24 Section 11(h) If an automatic shutdown is triggered or a loss of mechanical integrity is discovered, the owner or operator must immediately investigate and identify as expeditiously as possible the cause. If, upon such investigation, the well appears to be lacking mechanical integrity, or if monitoring required under paragraphs (e), (f), and (g) of this section otherwise indicates that the well may be lacking mechanical integrity, the owner or operator must: . . .notify the administrator within 24 hours of discovery;	The state regulation is unclear. It appears that failure to maintain mechanical integrity triggers an investigation, and only during or after the investigation is the owner or operator required to notify the state within 24 hours.
Pursuant to compliance with the requirement at §146.90(h) for surface air/soil gas monitoring or other monitoring technologies, if required by the Director, any release of carbon dioxide to the atmosphere or biosphere.	40 CFR §146.91(c)(5)	NONE	NEED
Owners or operators must notify the Director in writing 30 days in advance of:	40 CFR §146.91(d)	NONE	NEED
Any planned well workover;	40 CFR §146.91(d)(1)	NONE Sect 14(a)(ii)(C) Report, within 30 days the results of workover	NEED
Any planned stimulation activities, other than stimulation for formation testing conducted under §146.82; and	40 CFR §146.91(d)(2)	NONE	NEED
Any other planned test of the injection well conducted by the permittee.	40 CFR §146.91(d)(3)	NONE Sect 14(a)(ii)(B) Report, within 30 days the results of test, if required by Administrator	NEED
Regardless of whether a State has primary enforcement responsibility, owners or operators must submit all required reports, submittals, and notifications under subpart H of this part to EPA in an electronic format approved by EPA.	40 CFR §146.91(e)	Chapter 24 Section 14(c). Owners or operators must submit reports in an electronic format acceptable to the administrator. At the discretion of the administrator, other formats may be accepted.	The state regulation does not require submission of reports, etc., to EPA. The state regulation provides administrator's discretion to accept non-electronic formats.
Records shall be retained by the owner or operator as follows:	40 CFR §146.91(f)	Chapter 24 Section 5(e), 14(f), & 16(f).	The state regulation is less stringent than the federal rule in its record retention requirements for monitoring records.
All data collected under §146.82 for Class VI permit applications shall be retained throughout the life of the geologic sequestration project and for 10 years following site closure.	40 CFR §146.91(f)(1)	Chapter 24 Section 5(e). All data used to complete permit applications shall be kept by the applicant for a minimum of three (3) years from the date of signing.	See above.
Data on the nature and composition of all injected fluids collected pursuant to §146.90(a) shall be retained until 10 years after site closure. The Director may require the owner or operator to deliver the records to the Director at the conclusion of the retention period.	40 CFR §146.91(f)(2)	Chapter 24 Section 14(f). The permittee shall retain all monitoring records required by the permit for a period of three (3) years following facility closure.	See above. More specificity in Fed

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Monitoring data collected pursuant to §146.90(b) through (i) shall be retained for 10 years after it is collected.	40 CFR §146.91(f)(3)	Chapter 24 Section 14(f).	See above.
Well plugging reports, post-injection site care data, including, if appropriate, data and information used to develop the demonstration of the alternative post-injection site care timeframe, and the site closure report collected pursuant to requirements at §§146.93(f) and (h) shall be retained for 10 years following site closure.	40 CFR §146.91(f)(4)	Chapter 24 Section 16(f). The owner or operator must retain for three years following site closure, records collected during the post-injection site care period.	See above.
The Director has authority to require the owner or operator to retain any records required in this subpart for longer than 10 years after site closure.	40 CFR §146.91(f)(5)	NONE	NEED
40 CFR §146.92 Injection well plugging.			
Prior to the well plugging, the owner or operator must flush each Class VI injection well with a buffer fluid, determine bottomhole reservoir pressure, and perform a final external mechanical integrity test.	40 CFR §146.92(a)	Chapter 24 Section 15(a). Prior to the well plugging, the owner or operator must flush each Class VI injection well with a buffer fluid, determine bottom hole reservoir pressure, and perform a final external mechanical integrity test in accordance with Section 12.	Same.
<i>Well Plugging Plan.</i> The owner or operator of a Class VI well must prepare, maintain, and comply with a plan that is acceptable to the Director. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit. The well plugging plan must be submitted as part of the permit application and must include the following information:	40 CFR §146.92(b)	Chapter 24 Section 15(b) & (b)(i-ii). The owner or operator of a Class VI well must prepare, maintain, update on the same schedule as the update to the area of review delineation, and comply with a well plugging plan that is acceptable to the administrator. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit. The well plugging plan must be submitted as part of the permit application and must include the following information:	Similar.
Appropriate tests or measures for determining bottomhole reservoir pressure;	40 CFR §146.92(b)(1)	Chapter 24 Section 15(b)(ii)(A). Appropriate test or measure to determine bottom hole reservoir pressure;	Same.
Appropriate testing methods to ensure external mechanical integrity as specified in §146.89;	40 CFR §146.92(b)(2)	Chapter 24 Section 15(b)(ii)(B). Appropriate testing methods to ensure final external mechanical integrity as specified in Section 12;	Same.
The type and number of plugs to be used;	40 CFR §146.92(b)(3)	Chapter 24 Section 15(b)(ii)(C). The type and number of plugs to be used;	Same.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
The placement of each plug, including the elevation of the top and bottom of each plug;	40 CFR §146.92(b)(4)	Chapter 24 Section 15(b)(ii)(D). The placement of each plug including the elevation of the top and bottom of each plug;	Same.
The type, grade, and quantity of material to be used in plugging. The material must be compatible with the carbon dioxide stream; and	40 CFR §146.92(b)(5)	Chapter 24 Section 15(b)(ii)(E). The type and grade and quantity of material to be used in plugging; The material must be suitable for use with the carbon dioxide stream.	Similar.
The method of placement of the plugs.	40 CFR §146.92(b)(6)	Chapter 24 Section 15(b)(ii)(F). A description of the method of placement of the plugs.	Same.
<i>Notice of intent to plug.</i> The owner or operator must notify the Director in writing pursuant to §146.91(e), at least 60 days before plugging of a well. At this time, if any changes have been made to the original well plugging plan, the owner or operator must also provide the revised well plugging plan. The Director may allow for a shorter notice period. Any amendments to the injection well plugging plan must be approved by the Director, must be incorporated into the permit, and are subject to the permit modification requirements at §§144.39 or 144.41 of this chapter, as appropriate.	40 CFR §146.92(c)	Chapter 24 Section 15(c). The owner or operator must notify the administrator at least 60 days before plugging a well. If any changes have been made to the original well plugging plan, the owner or operator must also provide the revised well plugging plan. At the discretion of the administrator, a shorter notice period may be allowed.	Similar. The state regulation does not specify the mode of notification for the notice of intent to plug, i.e., that it must be in writing. The state regulation does not require amendments to the injection well plugging plan to be incorporated into the permit.
<i>Plugging report.</i> Within 60 days after plugging, the owner or operator must submit, pursuant to §146.91(e), a plugging report to the Director. The report must be certified as accurate by the owner or operator and by the person who performed the plugging operation (if other than the owner or operator.) The owner or operator shall retain the well plugging report for 10 years following site closure.	40 CFR §146.92(d)	Chapter 24 Section 15(d). Within 60 days after completion of plugging and abandonment of a well or well field the permittee shall submit to the administrator a final report which includes certification of completion in accordance with approved plans and specifications by a licensed professional engineer or a licensed professional geologist.	Similar. However, the state regulation does not specify record retention time for the well plugging report. Need "certified as accurate"

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
40 CFR §146.93 Post-injection site care and site closure.			
The owner or operator of a Class VI well must prepare, maintain, and comply with a plan for post-injection site care and site closure that meets the requirements of paragraph (a)(2) of this section and is acceptable to the Director. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit.	40 CFR §146.93(a)	Chapter 24 Section 16(a). The owner or operator of a Class VI well must prepare, maintain, update on the same schedule as the update to the area of review delineation, and comply with a plan for post-injection site care and site closure that meets the requirements of subpart (a)(ii) of this section and is acceptable to the administrator.	Similar. However, the state regulation does not include the following: “The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit.”
The owner or operator must submit the post-injection site care and site closure plan as a part of the permit application to be approved by the Director.	40 CFR §146.93(a)(1)	Chapter 24 Section 16(a)(i). The owner or operator must submit the post-injection site care and site closure plan as a part of the permit application to be approved by the administrator.	Same.
The post-injection site care and site closure plan must include the following information:	40 CFR §146.93(a)(2)	Chapter 24 Section 16(a)(ii). The post-injection site care and site closure plan must include the following information:	Same.
The pressure differential between pre-injection and predicted post-injection pressures in the injection zone(s);	40 CFR §146.93(a)(2)(i)	Chapter 24 Section 16(a)(ii)(B). The pressure differential between pre-injection and predicted post-injection pressures in the injection zone;	Same.
The predicted position of the carbon dioxide plume and associated pressure front at site closure as demonstrated in the area of review evaluation required under §146.84(c)(1);	40 CFR §146.93(a)(2)(ii)	Chapter 24 Section 16(a)(ii)(C). The predicted position of the carbon dioxide plume and associated pressure front at the time when plume movement has ceased and pressure differentials sufficient to cause the movement of injected fluids or formation fluids into a USDW are no longer present, as demonstrated in the area of review evaluation required under Section 8(c)(i);	Similar.
A description of post-injection monitoring location, methods, and proposed frequency;	40 CFR §146.93(a)(2)(iii)	Chapter 24 Section 16(a)(ii)(D). A description of post-injection monitoring locations, methods, and proposed frequency; and	Same.
A proposed schedule for submitting post-injection site care monitoring results to the Director pursuant to §146.91(e); and,	40 CFR §146.93(a)(2)(iv)	Chapter 24 Section 16(a)(ii)(E). A proposed schedule for submitting post-injection site care monitoring results to the administrator.	Similar, but does not specify electronic reporting to EPA (as required in 40 CFR 146.91(e)).
The duration of the post-injection site care timeframe and, if approved by the Director, the demonstration of the alternative post-injection site care timeframe that ensures non-endangerment of USDWs.	40 CFR §146.93(a)(2)(v)	NONE	The state regulation does not discuss a default post-injection site care timeframe or alternative timeframe.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Upon cessation of injection, owners or operators of Class VI wells must either submit an amended post-injection site care and site closure plan or demonstrate to the Director through monitoring data and modeling results that no amendment to the plan is needed. Any amendments to the post-injection site care and site closure plan must be approved by the Director, be incorporated into the permit, and are subject to the permit modification requirements at §§144.39 or 144.41 of this chapter, as appropriate.	40 CFR §146.93(a)(3)	Chapter 24 Section 16(a)(iii). Upon cessation of injection, owners or operators of Class VI wells must either submit an amended post-injection site care and site closure plan or demonstrate to the administrator through monitoring data and modeling results that no amendment to the plan is needed.	Similar. However, the state regulation does not explicitly require amendments to the post-injection site care and site closure plan to be incorporated into the permit. Need to go through 144.39 or 144.41
At any time during the life of the geologic sequestration project, the owner or operator may modify and resubmit the post-injection site care and site closure plan for the Director's approval within 30 days of such change.	40 CFR §146.93(a)(4)	Chapter 24 Section 16(a)(iv). The owner or operator may modify and resubmit the post-injection site care and site closure plan for the administrator's approval within 30 days of such change.	Similar.
The owner or operator shall monitor the site following the cessation of injection to show the position of the carbon dioxide plume and pressure front and demonstrate that USDWs are not being endangered.	40 CFR §146.93(b)	Chapter 24 Section 16(b). The owner or operator shall monitor the site following the cessation of injection. The owner or operator shall continue to conduct monitoring as specified in the administrator-approved post-injection site care and site closure plan until closure is authorized by the Director. The owner or operator can request and demonstrate to the satisfaction of the administrator that the post-injection site care and site closure plan should be revised to reduce the frequency of monitoring.	The state regulation does not specify, at Chapter 24 Section 16(b), the purpose of post-injection monitoring, i.e., to show the position of the carbon dioxide plume and pressure front and demonstrate that USDWs are not being endangered. However, the state regulation, at Chapter 24 Section 16(b)(iii), does require the owner or operator to demonstrate, prior to site closure, that no additional monitoring is needed to ensure there is no endangerment to a USDW, human health, safety, or the environment (see below). WY legislation defines plume stabilization as demonstrated by 3 consecutive yrs of monitoring.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
<p>Following the cessation of injection, the owner or operator shall continue to conduct monitoring as specified in the Director-approved post-injection site care and site closure plan for at least 50 years or for the duration of the alternative timeframe approved by the Director pursuant to requirements in paragraph (c) of this section, unless he/she makes a demonstration under (b)(2) of this section. The monitoring must continue until the geologic sequestration project no longer poses an endangerment to USDWs and the demonstration under (b)(2) of this section is submitted and approved by the Director.</p>	<p>40 CFR §146.93(b)(1)</p>	<p>Chapter 24 Section 16(b)(i-iv).</p> <p>The owner or operator shall continue to conduct monitoring as specified in the administrator-approved post-injection site care and site closure plan until closure is authorized by the Director.</p> <p>The owner or operator can request and demonstrate to the satisfaction of the administrator that the post-injection site care and site closure plan should be revised to reduce the frequency of monitoring.</p> <p>Prior to authorization for site closure, the owner or operator must demonstrate to the Director, based on monitoring, other site-specific data, and modeling that is reasonably consistent with site performance, that no additional monitoring is needed to ensure that the geologic sequestration project does not, and is not expected to pose an endangerment to a USDW or otherwise threaten human health, safety, or the environment. In addition, the owner or operator must demonstrate, based on the best available understanding of the site, including monitoring data and/or modeling, that all other site closure standards and requirements have been met.</p> <p>If such a demonstration cannot be made, the owner or operator must continue post-injection site care.</p>	<p>The state regulation does not discuss a 50 year default post-injection site care timeframe or alternative timeframe.</p>
<p>If the owner or operator can demonstrate to the satisfaction of the Director before 50 years or prior to the end of the approved alternative timeframe based on monitoring and other site-specific data, that the geologic sequestration project no longer poses an endangerment to USDWs, the Director may approve an amendment to the post-injection site care and site closure plan to reduce the frequency of monitoring or may authorize site closure before the end of the 50-year period or prior to the end of the approved alternative timeframe, where he or she has substantial evidence that the geologic sequestration project no longer poses a risk of endangerment to USDWs.</p>	<p>40 CFR §146.93(b)(2)</p>	<p>Chapter 24 Section 16(b)(ii)-(iii).</p> <p>The owner or operator can request and demonstrate to the satisfaction of the administrator that the post-injection site care and site closure plan should be revised to reduce the frequency of monitoring.</p> <p>Prior to authorization for site closure, the owner or operator must demonstrate to the Director, based on monitoring, other site-specific data, and modeling that is reasonably consistent with site performance, that no additional monitoring is needed to ensure that the geologic sequestration project does not, and is not expected to pose an endangerment to a USDW or otherwise threaten human health, safety, or the environment. In addition, the owner or operator must demonstrate, based on the best available understanding of the site, including monitoring data and/or modeling, that all other site closure standards and requirements have been met.</p>	<p>The state regulation does not discuss a default 50 year post-injection site care timeframe or alternative timeframe.</p>

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Prior to authorization for site closure, the owner or operator must submit to the Director for review and approval a demonstration, based on monitoring and other site-specific data, that no additional monitoring is needed to ensure that the geologic sequestration project does not pose an endangerment to USDWs.	40 CFR §146.93(b)(3)	Chapter 24 Section 16(b)(iii). Prior to authorization for site closure, the owner or operator must demonstrate to the Director, based on monitoring, other site-specific data, and modeling that is reasonably consistent with site performance, that no additional monitoring is needed to ensure that the geologic sequestration project does not, and is not expected to pose an endangerment to a USDW or otherwise threaten human health, safety, or the environment. In addition, the owner or operator must demonstrate, based on the best available understanding of the site, including monitoring data and/or modeling, that all other site closure standards and requirements have been met.	Similar.
If the demonstration in paragraph (b)(3) of this section cannot be made (i.e., additional monitoring is needed to ensure that the geologic sequestration project does not pose an endangerment to USDWs) at the end of the 50-year period or at the end of the approved alternative timeframe, or if the Director does not approve the demonstration, the owner or operator must submit to the Director a plan to continue post-injection site care until a demonstration can be made and approved by the Director.	40 CFR §146.93(b)(4)	Chapter 24 Section 16(b)(iv). If such a demonstration cannot be made, the owner or operator must continue post-injection site care.	The state regulation does not discuss a default post-injection site care timeframe or alternative timeframe, but the intent is the same. The state regulation does not require submission of a plan for further PISC.
<i>Demonstration of alternative post-injection site care timeframe.</i> At the Director's discretion, the Director may approve, in consultation with EPA, an alternative post-injection site care timeframe other than the 50 year default, if an owner or operator can demonstrate during the permitting process that an alternative post-injection site care timeframe is appropriate and ensures non-endangerment of USDWs. The demonstration must be based on significant, site-specific data and information including all data and information collected pursuant to §§146.82 and 146.83, and must contain substantial evidence that the geologic sequestration project will no longer pose a risk of endangerment to USDWs at the end of the alternative post-injection site care timeframe.	40 CFR §146.93(c)	NONE	The state regulation does not discuss a default post-injection site care timeframe or alternative timeframe. However, in certain cases, the state regulation requires the same type of information in the permit application as is required in the federal rule for a demonstration of an alternative timeframe.
A demonstration of an alternative post-injection site care timeframe must include consideration and documentation of:	40 CFR §146.93(c)(1)	NONE	
The results of computational modeling performed pursuant to delineation of the area of review under §146.84;	40 CFR §146.93(c)(1)(i)	NONE	
The predicted timeframe for pressure decline within the injection zone, and any other zones, such that formation fluids may not be forced into any USDWs; and/or the timeframe for pressure decline to pre-injection pressures;	40 CFR §146.93(c)(1)(ii)	NONE	

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
The predicted rate of carbon dioxide plume migration within the injection zone, and the predicted timeframe for the cessation of migration;	40 CFR §146.93(c)(1)(iii)	NONE	
A description of the site-specific processes that will result in carbon dioxide trapping including immobilization by capillary trapping, dissolution, and mineralization at the site;	40 CFR §146.93(c)(1)(iv)	NONE	
The predicted rate of carbon dioxide trapping in the immobile capillary phase, dissolved phase, and/or mineral phase;	40 CFR §146.93(c)(1)(v)	NONE	
The results of laboratory analyses, research studies, and/or field or site-specific studies to verify the information required in paragraphs (iv) and (v) of this section;	40 CFR §146.93(c)(1)(vi)	NONE	
A characterization of the confining zone(s) including a demonstration that it is free of transmissive faults, fractures, and micro-fractures and of appropriate thickness, permeability, and integrity to impede fluid (e.g., carbon dioxide, formation fluids) movement;	40 CFR §146.93(c)(1)(vii)	NONE	
The presence of potential conduits for fluid movement including planned injection wells and project monitoring wells associated with the proposed geologic sequestration project or any other projects in proximity to the predicted/modeled, final extent of the carbon dioxide plume and area of elevated pressure;	40 CFR §146.93(c)(1)(viii)	NONE	
A description of the well construction and an assessment of the quality of plugs of all abandoned wells within the area of review;	40 CFR §146.93(c)(1)(ix)	NONE	
The distance between the injection zone and the nearest USDWs above and/or below the injection zone; and	40 CFR §146.93(c)(1)(x)	NONE	
Any additional site-specific factors required by the Director.	40 CFR §146.93(c)(1)(xi)	NONE	
Information submitted to support the demonstration in paragraph (c)(1) of this section must meet the following criteria:	40 CFR §146.93(c)(2)	NONE	
All analyses and tests performed to support the demonstration must be accurate, reproducible, and performed in accordance with the established quality assurance standards;	40 CFR §146.93(c)(2)(i)	NONE	
Estimation techniques must be appropriate and EPA-certified test protocols must be used where available;	40 CFR §146.93(c)(2)(ii)	NONE	
Predictive models must be appropriate and tailored to the site conditions, composition of the carbon dioxide stream and injection and site conditions over the life of the geologic sequestration project;	40 CFR §146.93(c)(2)(iii)	NONE	

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Predictive models must be calibrated using existing information (e.g., at Class I, Class II, or Class V experimental technology well sites) where sufficient data are available;	40 CFR §146.93(c)(2)(iv)	NONE	
Reasonably conservative values and modeling assumptions must be used and disclosed to the Director whenever values are estimated on the basis of known, historical information instead of site-specific measurements;	40 CFR §146.93(c)(2)(v)	NONE	
An analysis must be performed to identify and assess aspects of the alternative post-injection site care timeframe demonstration that contribute significantly to uncertainty. The owner or operator must conduct sensitivity analyses to determine the effect that significant uncertainty may contribute to the modeling demonstration.	40 CFR §146.93(c)(2)(vi)	NONE	
An approved quality assurance and quality control plan must address all aspects of the demonstration; and,	40 CFR §146.93(c)(2)(vii)	NONE	
Any additional criteria required by the Director.	40 CFR §146.93(c)(2)(viii)	NONE	
<i>Notice of intent for site closure.</i> The owner or operator must notify the Director in writing at least 120 days before site closure. At this time, if any changes have been made to the original post-injection site care and site closure plan, the owner or operator must also provide the revised plan. The Director may allow for a shorter notice period.	40 CFR §146.93(d)	Chapter 24 Section 16(b)(v). The owner or operator must notify the Director at least 120 days before filing a request for site closure. At this time, if any changes have been made to the original post-injection site care and site closure plan, the owner or operator must also provide the revised plan. At the discretion of the Director, a shorter notice period may be allowed.	Same. Note that here (and elsewhere) the state rule refers to “Director” (like the federal rule); this should be changed to Administrator for consistency with state definitions. The state rule does not specify the method of notification.
After the Director has authorized site closure, the owner or operator must plug all monitoring wells in a manner which will not allow movement of injection or formation fluids that endangers a USDW.	40 CFR §146.93(e)	Chapter 24 Section 16(c). After the Director has authorized site closure, the owner or operator must plug all monitoring wells in a manner which will not allow movement of injection or formation fluids.	Similar.
The owner or operator must submit a site closure report to the Director within 90 days of site closure, which must thereafter be retained at a location designated by the Director for 10 years. The report must include:	40 CFR §146.93(f)	Chapter 24 Section 16(d). Once the Director has authorized site closure, the owner or operator must submit a site closure report within 90 days after completion of all closure operations. The report must include:	Similar. However, the state regulation does not include a record retention time for the site closure report.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Documentation of appropriate injection and monitoring well plugging as specified in §146.92 and paragraph (e) of this section. The owner or operator must provide a copy of a survey plat which has been submitted to the local zoning authority designated by the Director. The plat must indicate the location of the injection well relative to permanently surveyed benchmarks. The owner or operator must also submit a copy of the plat to the Regional Administrator of the appropriate EPA Regional Office;	40 CFR §146.93(f)(1)	Chapter 24 Section 16(d)(i-ii). Documentation of appropriate injection and monitoring well plugging as specified in Section 15 and paragraph (c) of this section. The owner or operator must provide a copy of a survey plat which has been submitted to the local zoning authority designated by the Director. The plat must indicate the location of the injection well(s) and monitoring wells relative to permanently surveyed benchmarks. The owner or operator must also submit a copy of the plat to the Regional administrator of the appropriate EPA Regional Office.	Same.
Documentation of appropriate notification and information to such State, local and Tribal authorities that have authority over drilling activities to enable such State, local, and Tribal authorities to impose appropriate conditions on subsequent drilling activities that may penetrate the injection and confining zone(s); and	40 CFR §146.93(f)(2)	Chapter 24 Section 16(d)(iii). Documentation of appropriate notification and information to such State, local and tribal authorities as have authority over drilling activities to enable such State and local authorities to impose appropriate conditions on subsequent drilling activities that may penetrate the injection and confining zone(s); and	Same.
Records reflecting the nature, composition, and volume of the carbon dioxide stream.	40 CFR §146.93(f)(3)	Chapter 24 Section 16(d)(iv). Records reflecting the nature, composition and volume of the carbon dioxide stream.	Same.
Each owner or operator of a Class VI injection well must record a notation on the deed to the facility property or any other document that is normally examined during title search that will in perpetuity provide any potential purchaser of the property the following information:	40 CFR §146.93(g)	Chapter 24 Section 16(e). Each owner or operator of a Class VI injection well must record a notation on the deed to the facility property or any other document that is normally examined during title search that will in perpetuity provide any potential purchaser of the property the following information:	Same.
The fact that land has been used to sequester carbon dioxide;	40 CFR §146.93(g)(1)	Chapter 24 Section 16(e)(i). The fact that land has been used to sequester carbon dioxide;	Same.
The name of the State agency, local authority, and/or Tribe with which the survey plat was filed, as well as the address of the Environmental Protection Agency Regional Office to which it was submitted; and	40 CFR §146.93(g)(2)	Chapter 24 Section 16(e)(ii). The name of the State agency, local authority, and/or tribe with which the survey plat was filed, as well as the address of the Regional Environmental Protection Agency Office to which it was submitted; and	Same.

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
The volume of fluid injected, the injection zone or zones into which it was injected, and the period over which injection occurred.	40 CFR §146.93(g)(3)	Chapter 24 Section 16(e)(iii). The volume of fluid injected, the injection zone or zones into which it was injected, and the period over which injection occurred.	Same.
The owner or operator must retain for 10 years following site closure, records collected during the post-injection site care period. The owner or operator must deliver the records to the Director at the conclusion of the retention period, and the records must thereafter be retained at a location designated by the Director for that purpose.	40 CFR §146.93(h)	Chapter 24 Section 16(f). The owner or operator must retain for three years following site closure, records collected during the post-injection site care period. The owner or operator must deliver the records to the Director at the conclusion of the retention period, and the records must thereafter be retained at a location designated by the Director for that purpose.	The state regulation has a shorter record retention time.
40 CFR §146.94 Emergency and remedial response.			
As part of the permit application, the owner or operator must provide the Director with an emergency and remedial response plan that describes actions the owner or operator must take to address movement of the injection or formation fluids that may cause an endangerment to a USDW during construction, operation, and post-injection site care periods. The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit.	40 CFR §146.94(a)	Chapter 24 Section 17(a). As part of the permit application, the owner or operator must provide the administrator with an emergency and remedial response plan that describes actions to be taken to address movement of the injectate or formation fluids that may cause an endangerment to a USDW or threaten human health, safety, or the environment during construction, operation, closure and post-closure periods.	The state regulation does not include the following: “The requirement to maintain and implement an approved plan is directly enforceable regardless of whether the requirement is a condition of the permit.”
If the owner or operator obtains evidence that the injected carbon dioxide stream and associated pressure front may cause an endangerment to a USDW, the owner or operator must:	40 CFR §146.94(b)	Chapter 24 Section 17(b). If monitoring data, or other evidence obtained by the owner or operator indicate that the injected carbon dioxide stream, displaced formation fluids or associated pressure front endangers a USDW or threatens human health, safety, or the environment, the owner or operator must:	The state regulation is less stringent; it requires the owner or operator to take action only if the injection actually endangers a USDW, rather than if it <i>may</i> endanger a USDW.
Immediately cease injection;	40 CFR §146.94(b)(1)	Chapter 24 Section 17(b)(i). Immediately cease injection;	Same.
Take all steps reasonably necessary to identify and characterize any release;	40 CFR §146.94(b)(2)	Chapter 24 Section 17(b)(ii). Take all steps reasonably necessary to identify and characterize the endangerment posed;	Similar. NOT similar, any release vs. endangerment posed

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Notify the Director within 24 hours; and	40 CFR §146.94(b)(3)	Chapter 24 Section 17(b)(iii). As soon as practical, provide verbal notice to the department of environmental quality of any excursion after the excursion is discovered, followed by written notice to all surface owners, mineral claimants, mineral owners, lessees and other owners of record of subsurface interests within thirty (30) days of when the excursion is discovered; and	The state regulation is less stringent/specific in the notification timeline (i.e., as soon as practical rather than within 24 hours). Is an excursion same as endangerment to USDW? "Excursion detection" means the detection of migrating carbon dioxide at or beyond the boundary of the geologic sequestration site. Okay if GS site is not a USDW.
Implement the emergency and remedial response plan approved by the Director.	40 CFR §146.94(b)(4)	Chapter 24 Section 17(b)(iv). Implement the emergency and remedial response plan approved by the administrator.	Same.
The Director may allow the operator to resume injection prior to remediation if the owner or operator demonstrates that the injection operation will not endanger USDWs.	40 CFR §146.94(c)	Chapter 24 Section 17(c). The administrator may allow the operator to resume injection prior to remediation if the owner or operator demonstrates that the injection operation will not endanger USDWs or otherwise threaten human health, safety, or the environment.	Same.
The owner or operator shall periodically review the emergency and remedial response plan developed under paragraph (a) of this section. In no case shall the owner or operator review the emergency and remedial response plan less often than once every five years. Based on this review, the owner or operator shall submit an amended emergency and remedial response plan or demonstrate to the Director that no amendment to the emergency and remedial response plan is needed. Any amendments to the emergency and remedial response plan must be approved by the Director, must be incorporated into the permit, and are subject to the permit modification requirements at §§144.39 or 144.41 of this chapter, as appropriate. Amended plans or demonstrations shall be submitted to the Director as follows:	40 CFR §146.94(d)	Chapter 24 Section 17(a)(i). The emergency and remedial response plan must be reviewed and updated, as necessary, on the same schedule as the update to the area of review delineation.	Similar. The state regulation and the federal rule both tie the updates of the emergency and remedial response plan to AoR reevaluations. However, the state regulation does not require the plan to be incorporated into the permit or to be submitted to the administrator. Also, plan must be approved by Administrator
Within one year of an area of review reevaluation;	40 CFR §146.94(d)(1)	NONE	The state regulation does not specify or limit when plans warrant an amendment and submission to the Director. NEED
Following any significant changes to the facility, such as addition of injection or monitoring wells, on a schedule determined by the Director; or	40 CFR §146.94(d)(2)	NONE	Same as above. NEED
When required by the Director.	40 CFR §146.94(d)(3)	NONE	Same as above. NEED

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
40 CFR §146.95 Class VI injection depth waiver requirements.			
This section sets forth information which an owner or operator seeking a waiver of the Class VI injection depth requirements must submit to the Director; information the Director must consider in consultation with all affected Public Water System Supervision Directors; the procedure for Director – Regional Administrator communication and waiver issuance; and the additional requirements that apply to owners or operators of Class VI wells granted a waiver of the injection depth requirements.	40 CFR §146.95	NONE	The state regulation does not mention injection depth at all, and the waiver process is optional; therefore, this section of the crosswalk was not completed for Wyoming.
In seeking a waiver of the requirement to inject below the lowermost USDW, the owner or operator must submit a supplemental report concurrent with permit application. The supplemental report must include the following,	40 CFR §146.95(a)		
A demonstration that the injection zone(s) is/are laterally continuous, is not a USDW, and is not hydraulically connected to USDWs; does not outcrop; has adequate injectivity, volume, and sufficient porosity to safely contain the injected carbon dioxide and formation fluids; and has appropriate geochemistry.	40 CFR §146.95(a)(1)		
A demonstration that the injection zone(s) is/are bounded by laterally continuous, impermeable confining units above and below the injection zone(s) adequate to prevent fluid movement and pressure buildup outside of the injection zone(s); and that the confining unit(s) is/are free of transmissive faults and fractures. The report shall further characterize the regional fracture properties and contain a demonstration that such fractures will not interfere with injection, serve as conduits, or endanger USDWs.	40 CFR §146.95(a)(2)		
A demonstration, using computational modeling, that USDWs above and below the injection zone will not be endangered as a result of fluid movement. This modeling should be conducted in conjunction with the area of review determination, as described in §146.84, and is subject to requirements, as described in §146.84(c), and periodic reevaluation, as described in §146.84(e).	40 CFR §146.95(a)(3)		
A demonstration that well design and construction, in conjunction with the waiver, will ensure isolation of the injectate in lieu of requirements at 146.86(a)(1) and will meet well construction requirements in paragraph (f) of this section.	40 CFR §146.95(a)(4)		
A description of how the monitoring and testing and any additional plans will be tailored to the geologic sequestration project to ensure protection of USDWs above and below the injection zone(s), if a waiver is granted.	40 CFR §146.95(a)(5)		

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Information on the location of all the public water supplies affected, reasonably likely to be affected, or served by USDWs in the area of review.	40 CFR §146.95(a)(6)		
Any other information requested by the Director to inform the Regional Administrator's decision to issue a waiver.	40 CFR §146.95(a)(7)		
To inform the Regional Administrator's decision on whether to grant a waiver of the injection depth requirements at §§144.6 of this chapter, 146.5(f), and 146.86(a)(1), the Director must submit, to the Regional Administrator, documentation of the following :	40 CFR §146.95(b)		
An evaluation of the following information as it relates to siting, construction, and operation of a geologic sequestration project with a waiver:	40 CFR §146.95(b)(1)		
The integrity of the upper and lower confining units;	40 CFR §146.95(b)(1)(i)		
The suitability of the injection zone(s) (e.g., lateral continuity; lack of transmissive faults and fractures; knowledge of current or planned artificial penetrations into the injection zone(s) or formations below the injection zone);	40 CFR §146.95(b)(1)(ii)		
The potential capacity of the geologic formation(s) to sequester carbon dioxide, accounting for the availability of alternative injection sites;	40 CFR §146.95(b)(1)(iii)		
All other site characterization data, the proposed emergency and remedial response plan, and a demonstration of financial responsibility;	40 CFR §146.95(b)(1)(iv)		
Community needs, demands, and supply from drinking water resources;	40 CFR §146.95(b)(1)(v)		
Planned needs, potential and/or future use of USDWs and non-USDWs in the area;	40 CFR §146.95(b)(1)(vi)		
Planned or permitted water, hydrocarbon, or mineral resource exploitation potential of the proposed injection formation(s) and other formations both above and below the injection zone to determine if there are any plans to drill through the formation to access resources in or beneath the proposed injection zone(s)/formation(s);	40 CFR §146.95(b)(1)(vii)		
The proposed plan for securing alternative resources or treating USDW formation waters in the event of contamination related to the Class VI injection activity; and,	40 CFR §146.95(b)(1)(viii)		
Any other applicable considerations or information requested by the Director.	40 CFR §146.95(b)(1)(ix)		

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Consultation with the Public Water System Supervision Directors of all States and Tribes having jurisdiction over lands within the area of review of a well for which a waiver is sought.	40 CFR §146.95(b)(2)		
Any written waiver-related information submitted by the Public Water System Supervision Director(s) to the (UIC) Director.	40 CFR §146.95(b)(3)		
Pursuant to requirements at §124.10 of this chapter and concurrent with the Class VI permit application notice process, the Director shall give public notice that a waiver application has been submitted. The notice shall clearly state:	40 CFR §146.95(c)		
The depth of the proposed injection zone(s);	40 CFR §146.95(c)(1)		
The location of the injection well(s);	40 CFR §146.95(c)(2)		
The name and depth of all USDWs within the area of review;	40 CFR §146.95(c)(3)		
A map of the area of review;	40 CFR §146.95(c)(4)		
The names of any public water supplies affected, reasonably likely to be affected, or served by USDWs in the area of review; and,	40 CFR §146.95(c)(5)		
The results of UIC-Public Water System Supervision consultation required under paragraph (b)(2) of this section.	40 CFR §146.95(c)(6)		
Following public notice, the Director shall provide all information received through the waiver application process to the Regional Administrator. Based on the information provided, the Regional Administrator shall provide written concurrence or non-concurrence regarding waiver issuance.	40 CFR §146.95(d)		
If the Regional Administrator determines that additional information is required to support a decision, the Director shall provide the information. At his or her discretion, the Regional Administrator may require that public notice of the new information be initiated.	40 CFR §146.95(d)(1)		
In no case shall a Director of a State-approved program issue a waiver without receipt of written concurrence from the Regional Administrator.	40 CFR §146.95(d)(2)		
If a waiver is issued, within 30 days of waiver issuance, EPA shall post the following information on the Office of Water's Web site:	40 CFR §146.95(e)		
The depth of the proposed injection zone(s);	40 CFR §146.95(e)(1)		

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
The location of the injection well(s);	40 CFR §146.95(e)(2)		
The name and depth of all USDWs within the area of review;	40 CFR §146.95(e)(3)		
A map of the area of review;	40 CFR §146.95(e)(4)		
The names of any public water supplies affected, reasonably likely to be affected, or served by USDWs in the area of review; and	40 CFR §146.95(e)(5)		
The date of waiver issuance.	40 CFR §146.95(e)(6)		
Upon receipt of a waiver of the requirement to inject below the lowermost USDW for geologic sequestration, the owner or operator of the Class VI well must comply with:	40 CFR §146.95(f)		
All requirements at §§146.84, 146.85, 146.87, 146.88, 146.89, 146.91, 146.92, and 146.94;	40 CFR §146.95(f)(1)		
All requirements at §146.86 with the following modified requirements:	40 CFR §146.95(f)(2)		
The owner or operator must ensure that Class VI wells with a waiver are constructed and completed to prevent movement of fluids into any unauthorized zones including USDWs, in lieu of requirements at §146.86(a)(1).	40 CFR §146.95(f)(2)(i)		
The casing and cementing program must be designed to prevent the movement of fluids into any unauthorized zones including USDWs in lieu of requirements at §146.86(b)(1).	40 CFR §146.95(f)(2)(ii)		
The surface casing must extend through the base of the nearest USDW directly above the injection zone and be cemented to the surface; or, at the Director's discretion, another formation above the injection zone and below the nearest USDW above the injection zone.	40 CFR §146.95(f)(2)(iii)		
All requirements at §146.90 with the following modified requirements:	40 CFR §146.95(f)(3)		
The owner or operator shall monitor the groundwater quality, geochemical changes, and pressure in the first USDWs immediately above and below the injection zone(s); and in any other formations at the discretion of the Director.	40 CFR §146.95(f)(3)(i)		

Federal Requirement	Federal Citation	Wyoming State Citation and Requirement	Different From Federal Requirement?
Testing and monitoring to track the extent of the carbon dioxide plume and the presence or absence of elevated pressure (e.g., the pressure front) by using direct methods to monitor for pressure changes in the injection zone(s); and, indirect methods (e.g., seismic, electrical, gravity, or electromagnetic surveys and/or down-hole carbon dioxide detection tools), unless the Director determines, based on site-specific geology, that such methods are not appropriate.	40 CFR §146.95(f)(3)(ii)		
All requirements at §146.93 with the following, modified post-injection site care monitoring requirements:	40 CFR §146.95(f)(4)		
The owner or operator shall monitor the groundwater quality, geochemical changes and pressure in the first USDWs immediately above and below the injection zone; and in any other formations at the discretion of the Director.	40 CFR §146.95(f)(4)(i)		
Testing and monitoring to track the extent of the carbon dioxide plume and the presence or absence of elevated pressure (e.g., the pressure front) by using direct methods in the injection zone(s); and indirect methods (e.g., seismic, electrical, gravity, or electromagnetic surveys and/or down-hole carbon dioxide detection tools), unless the Director determines based on site-specific geology, that such methods are not appropriate;	40 CFR §146.95(f)(4)(ii)		
Any additional requirements requested by the Director designed to ensure protection of USDWs above and below the injection zone(s).	40 CFR §146.95(f)(5)		
		Will need to define regional vs. EPA administrator, or not speak of the regional administrator	